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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
SINCE 1901

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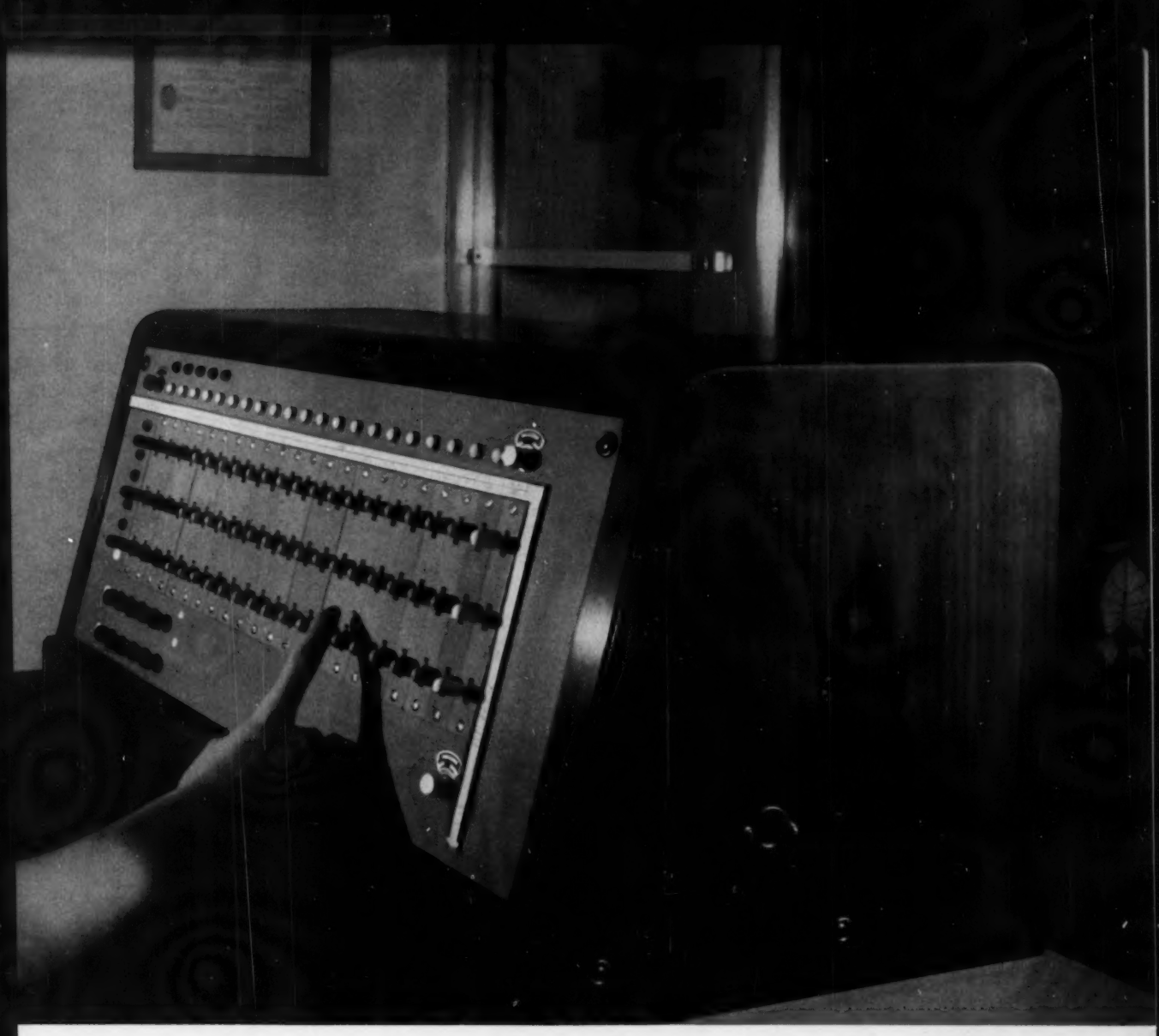
Guaranteed Circulation This Issue
13,173 of Which 12,649 Is Paid

MERCHANDISING IDEA

Enclosure around new buildings can be used to merchandise telephone service. Above photo shows how Mountain States Telephone & Telegraph Co. uses enclosure in Denver to feature "Rush to Rockies" centennial and to plug Direct Distance Dialing. See page 48.

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

How to boost your profits and prestige



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Conductor: pure copper wire				
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Mutual Capacitance 900 cycles A.C., mfd/mile, max.	0.080	0.080	0.090	0.084
Capacitance Unbalance 900 cycles A.C., micro-microfarads	*	*	at 22 AWG: up to 1000′—100; 1001′ to 2000′—150; 2001′ and longer—200 at 19 AWG: up to 1000′—100; 1001′ to 2000′—150; 2001′ and longer—200	
Dielectric Strength: 60 cycles A.C., for 2 sec., volts rms				
conductor-to- conductor-to- sheath	355	355	355	500
core-to- sheath	850	1000	1000	1000

Insulation Resistance: not less than 1,000 megohm-miles at 60°F measured with a D.C. potential of 100 to 550 volts.

*not required, except if adjacent pairs are found with like lengths of twist when the 900 cycle A.C. capacitance unbalance shall not exceed 400 micro-microfarads.

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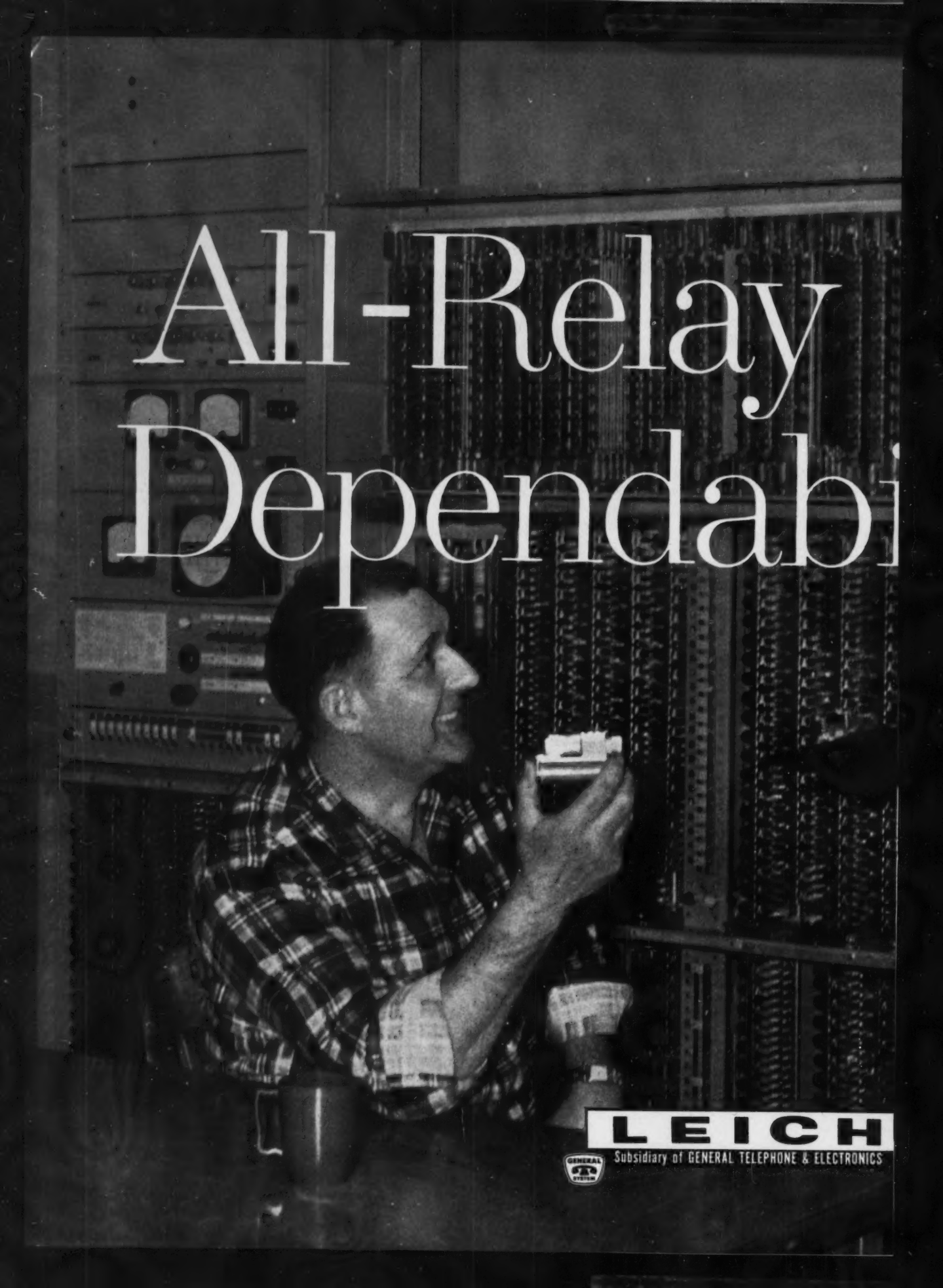
† *Major inventories are maintained at four strategic warehouses in New York, Chicago, Kansas City (Kan.), and Burlingame, Calif., to guarantee ready access and prompt delivery.*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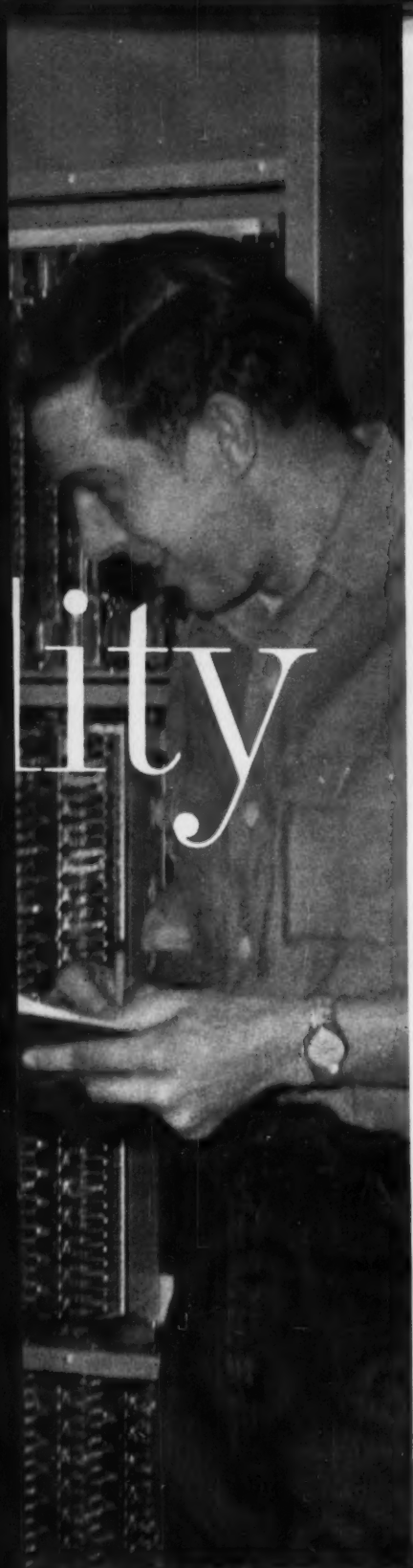

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MONEY-SAVING FEATURES OF THE LEICH DIAL SYSTEM

reduces maintenance for over 1,000 exchanges

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Since the Leich Dial System is all-relay, there's simply less to go wrong. It eliminates mechanical switching mechanisms which are apt to wear or require maintenance or adjustment. Then, too, Leich relays have been tested for millions of operations without failure.

Surveys show that Leich's Dial System requires less upkeep than any other switching equipment. These surveys are based on actual cost-per-station reports made by telephone companies.

A few of the 1,000 exchanges that cut maintenance costs with the Leich Dial System are listed here.

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FLASHES AND PLUGS

SIMMERING DOWN TO BUSINESS. An Oklahoma woman telephoned a businessman who asked to be excused, and said, "May I telephone you later when I can collect my thoughts and think through my schedule?"

Learning later that her call came through just when he was dodging firemen as they fought a fire in his home, she nominated the man as the coolest head in town!

•

"WILL YOU?" AT $3..."YES" AT $400. A Peruvian, who left his sweetheart behind when he came to the U. S. for on-the-job training, didn't have his mind on marriage when he came. However, after a while, he was lonely, and this prompted him to begin telephoning her.

Jorge Pardo, 33, became more fervent as he telephoned home to Lima. Each call cost him $3 for three minutes.

Wooing by telephone, however, did not prove effective until Pardo's telephone bill reached $400. Then, Carmen Ruez, his fiancée, gave in, said "Yes," and hopped a plane for the U. S. and Jorge.

•

DOG HAS HIS DAY. Planning a vacation in Florida, the telephone man didn't know whether to take his dog along or not.

In reply to his letter, the hotel manager answered: "I've been in this business for 30 years.

"Never have I called on police to eject a disorderly dog.

"Never has a dog set fire to a bed with a cigarette.

"I have never found a hotel towel or blanket in a dog's suitcase, nor a whiskey ring on a dresser in his room.

"The dog is welcome, and if he will vouch for you, come along, too."

•

BUT—NOT ALONE BY THE TELEPHONE. The *Illinois Bell News* opines that marriage is like a midnight telephone call —you get a ring and then you wake up.

•

LET'S GO ALL OUT! An inexperienced woman investor in California telephoned her broker in San Francisco and said, "I have been noticing that some of these electronics manufacturers making semi-conductors seem to be doing pretty well and earning a lot of money.

"Why wouldn't it be a good idea to buy some stock in a company making whole conductors?"

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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

September 5, 1959

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VOICE OF A GUIDED MISSILE

This is a missile-borne transmitter. It is the "voice" of a missile in flight . . . part of a new radio-inertial guidance system developed by Bell Telephone Laboratories for the Ballistic Missile Division of the Air Force.

This versatile system helped deliver the nose cone of a Thor-Able test missile precisely to its South Atlantic target area—5000 miles from Cape Canaveral, Florida. So accurately was the nose cone placed that a waiting group of ships and planes retrieved it in a matter of hours. It was the first nose cone ever to be recovered after so long a flight.

The command guidance system which made such accuracy possible combines precision tracking radar with a special Remington Rand Univac computer. Fed a steady stream of signals from the missile-borne transmitter, the ground-based equipment compares the missile's flight path with the preselected path. Corrective steering orders are computed and transmitted automatically to the missile. The ground station monitors the progress of the flight continuously and obtains immediate evaluation of mission success. And since the principal control equipment is kept on the ground, expendable hardware in the missile itself is minimized.

This radio-inertial guidance system is a product of the Bell Laboratories-Western Electric development-production team. It is in production at Western Electric for the first operational squadrons of the Titan intercontinental ballistic missile.

Bell Labs scientists and engineers developed the world's most versatile telephone network and much of our nation's radar. They have constantly pioneered in missile systems. From their storehouse of knowledge and experience comes this new achievement in missile guidance.

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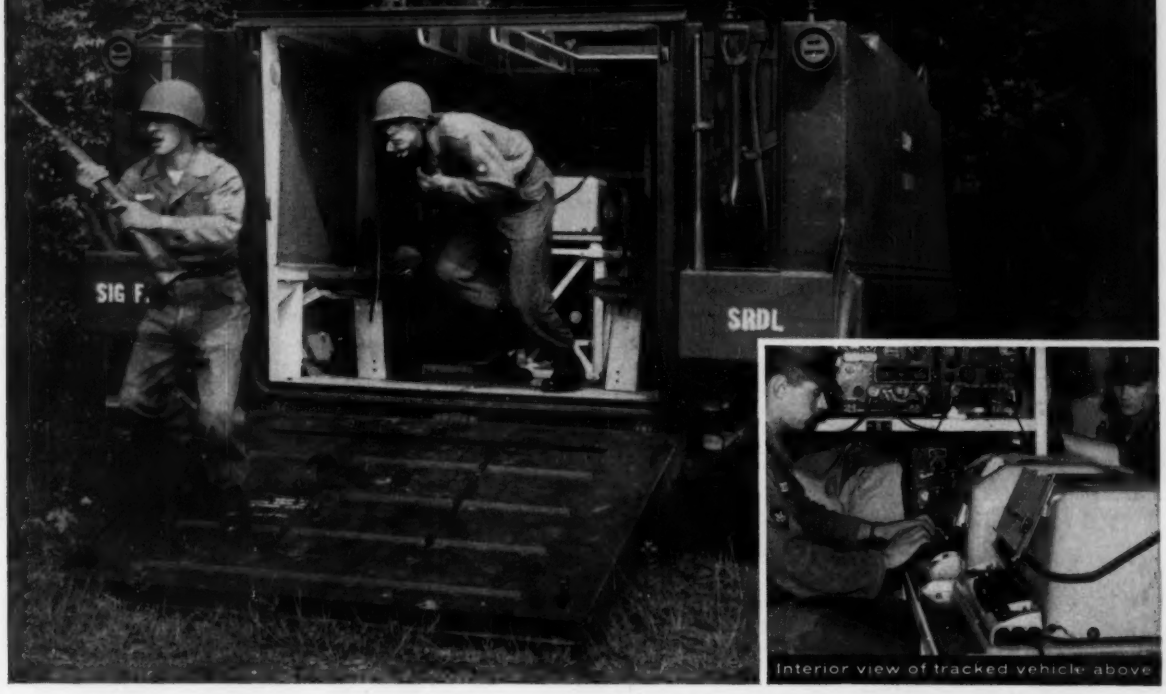

Interior view of tracked vehicle above

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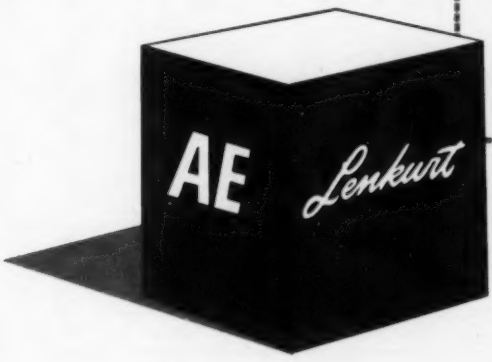

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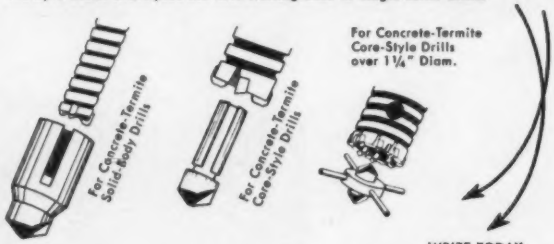
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average 5 to 8 man-minutes for complete installation

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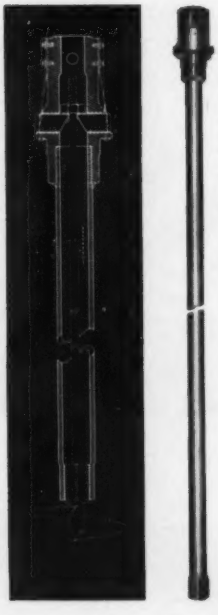
Chance Power-Installed Screw Anchors, ranging from 78 to 176 square inches in area, can be speedily installed in all types of soil, except extremely rocky soil. Your present power boring equipment, regardless of type, can be easily adapted to power anchor installation. Only one new part is needed—the wrench shown below. This wrench transmits torque from the power equipment directly to the specially designed hub on the anchor helix. Since the anchor rod is not subjected to torque, it only has to be heavy enough to support the guy load—a cost-saving factor.

Installation procedure is extremely simple. *Step one* is to remove the Thimbleye or Twineye nut and slide wrench on the anchor. *Step two* is to fasten the wrench to the "Kelly Bar" of the power-digger, or, to fasten the wrench on the pilot bit of the auger using an adapter. *Step three* is to drive the anchor with the power equipment. *Step four* is to release the wrench from the anchor and retrieve it from the ground. (The spring-loaded "dogs" that lock rod in position are easy to release.) *Step five* is simply replacing the Thimbleye on the end of the rod—your anchor is ready for hooking up the guy wire.

These five steps are accomplished in a matter of minutes. Repeated time tests in various types of soil prove that Power-Installed Screw Anchors averaged only 5 to 8 man-minutes for a complete installation *—from the time the equipment was moved into position until the anchor was ready for the guy!*



THE ONLY PART NEEDED is this special wrench. (Diagram shows how it fits the anchor.) Wrenches are made to fit all popular makes of earth-borers.

THIMBLEYE and TWINEYE guy-wire nuts are available. They distribute pulling stresses uniformly and keep guy wire from spreading, kinking, or bending.

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR
AND EDITOR, PUBLIC UTILITIES FORTNIGHTLY

Brief history of labor versus management fact-finding efforts worthwhile now since steel strike could have adverse repercussions for the telephone industry. . . . there's also possibility the public might get angry enough to demand steel controls. Comments on telephone labor outlook, including views of CWA Head Beirne.

LABOR DAY, 1959, is about as good a time as any to take stock of the labor union situation as seen from the nation's capital. In the telephone business, for the moment at least, the scene seems to be fairly quiet. The same might be said for the other regulated utility industries. But there was, as these lines were written, a raging fire still going in the steel industry; and that was about the only fire going there. Most of the blast furnaces were quite cold.

Yet, as this writer sees it, there is a possibility that the steel controversy, if not settled soon, could have some seriously adverse effects on the public utilities for two main reasons: (1) Promotion of inflation, to which regulated utilities are particularly vulnerable, and (2) agitation for more government intervention, which could destroy the stability of our enterprise system by blurring the economic distinction between free enterprise industries and regulated public utility business.

For the past quarter-century, the phrase "Fact Finding" (with capital letters) has fallen to low repute in the minds of most informed men and women of mature judgment in this country who honestly try to be objective about labor-management disputes in general. The phrase was first used, in this connection, along about the late thirties when the Roosevelt administration was trying to make a go of the original Wagner Act.

In those days, quite a few people were fooled by the high-sounding, mouth-filling phrase. On the surface, "Fact Finding" sounded as disinterested as the gentle rain from heaven —falling alike on the just and the unjust. In actual practice, it was soon recognized as a scramble to select, rather than find, facts to support a preconceived conclusion or recommendation.

To begin with, a commission was appointed to make a "Fact Finding Report" on a labor dispute. This commission promptly took off into the jungles of bureaucracy for a stated number of days. At the end of that time, it turned up with a "Report," the most important part of which was the last few pages, or paragraphs, under the heading "Recommendations." The front part of the report was garnished with some facts chosen (well or poorly, according to the skill of the Fact Finders) to support the recommendations.

Business management soon found, in those early days, that "Fact Finding" was something like getting into a crap game with loaded dice. Ostensibly, it was a substitute of a public solution for private bargaining between the labor and management parties affected. But since management invariably lost out on most of its points, it became apparent that "Fact Finding" simply provided the umpire with a script. The economic duel was resolved by making it two-to-one.

We have come a long way from those days when idealists honestly believed such stuff as the late Heywood Broun once wrote: "No strike was ever wrong; there never was one without justification." This is tantamount to saying that organized labor is always right.

At that time it might have been argued, of course, that the balance between labor and management needed such drastic overhauling that some degree of monkeying with the official scales of justice was necessary to step up the economic recovery. But even more modern adventures in the realm of administrative "Fact Finding" are still suspect, as long as they are cast in the mold of official "recommendations."

It was probably for this reason that Secretary of Labor Mitchell late last month decided to pull a switch and bring in his "Fact Finding" (on the current steel dispute) without any recommendations appended. He merely found the facts—all kinds of facts—on both sides of the line. Trouble with that approach is—giving Secretary Mitchell all due credit for effort at impartiality—that it provides a happy hunting ground for both sides.

As soon as the Secretary had thrown his big basket of Facts under the public spotlight, both the steelworkers and the steel managers busied themselves picking and choosing their respective preferences from the miscellaneous total provided. This enabled them to rush into print with the added endorsement of an official source for Facts carefully selected to support their particular self-interests.

Just by way of a thumb-nail sketch of Secretary Mitchell's report, here are

the facts which show that the steel industry has been leading the inflation parade:

Production has been increasing at the rate of 3 per cent a year—58 per cent since 1940.

Employment costs have gone up 125 per cent while the price of basic steel products has gone up 178 per cent. (No, this does not necessarily mean that the owners have made out better than the workers in the inflation parade. It means that the employment cost increase of 125 per cent was paid out of the total "take" for steel products, leaving the owners to share the balance of the revenue increase with increased taxes and other operating cost boosts.)

Average hourly earnings of steelworkers—$3.10 an hour—are higher than the average of other manufacturing industry—$2.23 an hour. Auto workers average $2.68 an hour.

Postwar steel profits on a sales dollar have been higher than for all manufacturing. In the first half of 1959 the 20 largest steel companies had a rate of return of 16 per cent on net worth compared with 14 per cent for an average of other big industrial companies.

Justification for a steel price cut to stem the inflationary tide can be seen in the figures on steel exports (which are falling) and imports (which are rising). In other words, this means loss of sales to foreign competition, which hurts both domestic employment and domestic profits.

Labor-management bargaining in the steel dispute was found to be halfhearted, with little inclination on either side to face facts and get back to work.

But what does the report show from a third, yet most important, viewpoint? That is to say, the *public interest*. On the whole, Secretary Mitchell's report points to a tiresome merry-go-round of price and wage increases quite inimical to the interest of the public as a consumer. It points to both sides getting away with a fight as phony as a TV wrestling match for the past decade and a half.

Here we have two supposed antagonists—an economically monopolistic production industry and a nationally monopolistic labor union—staging a series of wage "battles" with always the same outcome. And always the public, innocent bystander, as the saying goes, has had to pick up the tab.

As a result of this series of sham battles two facts (with a small "f") are self-evident: (1) Wages in the steel industry already are well above the industrial average; (2) an unbroken line of corporate steel profits has likewise shot well above the average of other industry.

Who pays for both? Don't bother asking. The bill is always passed on to the general public in the form of price inflation. Inflation picks the pocket of every man, woman, and child in this country by debasing the purchasing power of everybody's money, from trust funds to piggy banks.

Operation Worm Turn?

This is not a legal conspiracy, of course. No public prosecutor can hail these waltzing gladiators into court for flimflamming the customers. But they have been flimflammed just the same, and increasing numbers of them are becoming wise to the pitch. They do not like the show. And since they cannot under the circumstances, walk out on it, they are in a mood to take more aggressive action. We may eventually witness Operation Worm Turn.

Secretary Mitchell's report shows that at no time since the war, and long before, has any part of the gains in productivity in the steel industry been passed on to the public in the form of reduced prices. In every one of the half-dozen negotiations since the war, a monopolistic union has held a pistol to the head of industry—and a monopolistic industry has forked over knowing that, because it is a monopoly, it could pass on the cost of this hold-up to a helpless public in the form of inflationary increases in steel prices. Thus, together steel labor and steel management have been active agents of our postwar inflation.

So what can the public do, if it gets mad enough? There are a number of things. And none of them are likely

(Please turn to page 52)

Convention Calendar

1959

Association	*Date*	*City*	*Hotel*
Tennessee	Sept. 9 and 10	Nashville	Hermitage
Arkansas	Sept. 14 and 15	Hot Springs	Arlington
Michigan	Sept. 16 and 17	Grand Rapids	Pantlind
Rocky Mountain	Sept. 16, 17 and 18	Salt Lake City, Utah	Utah
New England	Sept. 21, 22 and 23	Bretton Woods, N.H.	Mt. Washington
West Virginia	Sept. 23 and 24	Davis	Blackwater Falls Lodge
Nevada	Sept. 23, 24, and 25	Elko	Stockmen's
North Carolina	Oct. 4, 5, 6 and 7	Pinehurst	Carolina
Alaska	Oct. 5, 6 and 7	Anchorage	Contact: H. R. Zinns P. O. Box 400, Anchorage
USITA Annual Convention	Oct. 11, 12, 13 and 14	Chicago	Conrad Hilton
South Carolina	Oct. 25, 26 and 27	Clemson	Clemson House
Virginia	Oct. 29 and 30	Roanoke	Roanoke
Alabama	Nov. 9 and 10	Birmingham	Thomas Jefferson
Georgia	Nov. 11 and 12	Atlanta	Dinkler-Plaza
Oklahoma	Nov. 18 and 19	Oklahoma City	Skirvin
South Dakota	Nov. 18 and 19	Huron	Marvin-Hughitt
Florida	Nov. 30 and Dec. 1	Jacksonville	Robert Meyer

1960

Minnesota	Feb. 7, 8, 9 and 10	St. Paul	St. Paul
Louisiana	Feb. 24 and 25	New Orleans	Jung
Kentucky	Mar. 1	Lexington	Phoenix
Ohio	Mar. 28, 29, and 30.	Columbus	Deshler Hilton
Iowa	Apr. 5 and 6	Des Moines	Ft. Des Moines
Nebraska	Apr. 19 and 20	Omaha	Unannounced
Indiana	May 4 and 5	Indianapolis	Claypool
Illinois	May 19 and 20	Springfield	Abraham Lincoln
Kansas-Missouri*	May 24 and 25	Kansas City	Town House
Pennsylvania	June 6 and 7	Bedford Springs	Bedford Springs
California	June 8, 9 and 10	San Francisco	Fairmont
Washington-Oregon*	June 16 and 17	Portland	Sheraton Portland
New York	June 20, 21 and 22	Schroon Lake	Scaroon Manor

*Joint Convention

Amplitude Modulation In Carrier Systems

By Arthur L. Albert*

PART I

THE EVER-INCREASING volume of long distance traffic is being handled largely by frequency-division multiplex systems. In such systems, many conversations simultaneously occur over a common path, each conversation occupying a different frequency band. The common transmission path may be an open-wire line, a cable, or a space path as in point-to-point radio-relay systems.

The frequency band occupied by the voice signals extends (for telephone purposes) from about 200 to 4,000 cycles per second. In a frequency division multiplex, or carrier, system, each conversation must be raised from the band just mentioned to a higher, and different, frequency band.

In a sense, the various conversations are "frequency stacked" one on the other (with guard bands between) for transmission to the distant station. This frequency-band shifting, or translation, and the resulting stacking, is accomplished either by frequency modulation, or by amplitude modulation, the latter method being commonly used in telephone multiplex.

Only amplitude modulation systems will be considered in the following discussions. The basic terminal equipment is the same, or closely similar, for the various systems, even though the final transmission path may be an open-wire line, a cable, or space.

Both amplitude modulation at the sending end and demodulation at the receiving end are accomplished by the use of nonsymmetrical varistors. These are semiconductor devices whose resistances vary with the magnitudes or directions of the applied signal voltages or currents. The copper-oxide rectifiers used for over 20 years for modulation and demodulation in carrier-telephone systems are classed as varistors; so are the crystal rectifiers, or crystal diodes, as they often are called.

This article, and a companion article in a subsequent issue of TELEPHONY, will discuss amplitude modulation and demodulation using varistors. The discussions will apply to both the copper-oxide and the crystal rectifier types. For simplicity, both will be referred to merely as varistors.

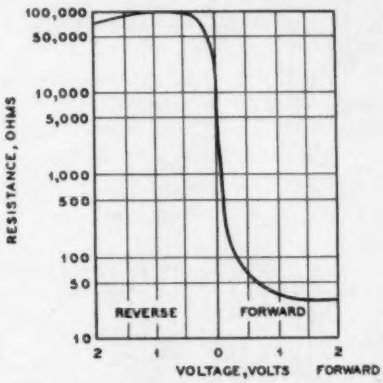

Fig. 1. **Approximate characteristics of typical varistors used in modulation and demodulation. Forward and reverse voltages refer to polarities of low, and high, resistances respectively. The reverse resistances of many crystal rectifiers are higher than shown. In explaining modulation and demodulation, the forward resistance will be assumed zero, and the reverse resistance will be considered infinite.**

Varistor characteristics

The direct-current characteristics of typical nonsymmetrical varistors are shown in *Fig. 1*, which applies in general to both copper-oxide and crystal rectifiers.

If the polarity of the applied voltage is such as to bias a varistor in the reverse direction, the resistance that the varistor offers to current flow is about 100,000 ohms or more, depending on the individual type. This resistance will be considered an open circuit.

If a varistor is biased in the forward direction, the resistance falls to less than 50 ohms; this will be considered to be a short circuit.

That is, a varistor as used in amplitude modulation and demodulation has the characteristics of a voltage-controlled switch, opening or closing a circuit in accordance with the magnitude and polarity of the applied voltage.

In the discussions that follow, the maximum value of the alternating sine-wave carrier voltage always will be assumed considerably greater than that of the speech signal voltage; also the carrier voltage will have a frequency much greater than that of the speech voltage. The carrier voltage will be assumed to "switch" the varistor units between zero and infinite resistance at the carrier-frequency rate. Other explanations are possible, but the assump-

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tions just made lead to a simple method of explaining amplitude modulation and demodulation.

Unbalanced bridge varistor modulator

The circuit of *Fig. 2* is commonly called an unbalanced bridge modulator. Generator E_v is the modulating voice-frequency signal source assumed to be a single frequency f_v, of open-circuit voltage magnitude E_v, and of internal resistance R_v.

Generator E_c represents the carrier-frequency signal source of a single frequency f_c, open-circuit voltage E_c, and internal resistance R_c. All elements will be considered nonreactive.

Resistor R_L is the output load, such as a transmission circuit to the distant station, to which the modulated signal is delivered.

The arrow heads represent the varistor units and point in the low-resistance directions.

Thus, if the electrode represented by the arrow head is made positive, and the electrode represented by the short straight line is made negative (forward bias), the resistance falls to a low value and current readily flows in the direction of the arrow head. If the polarities are reversed (reverse bias), the resistance rises to a large value and negligible current flows.

Thus in *Fig. 2B*, at the instant the alternating carrier voltage has the polarities indicated by the + and — signs, two of the varistor elements are "shorted," and two are "opened," and the voice voltage E_v will force current I_L down through load resistor R_L.

For the next half cycle of applied carrier voltage, the polarities are as shown in *Fig. 2C*, and the voice voltage E_v will force current I_L up through R_L as indicated.

As *Fig. 2D* shows, the frequency of the voice voltage is much lower than the carrier frequency; also, it will be noted the carrier voltage E_c always is connected across R_L. The current through R_L will appear as in *Fig. 2D*, and will be an amplitude modulated wave composed of a carrier component C of frequency f_c, an upper side frequency C + V of frequency $f_c + f_v$, and a lower side frequency, frequency C — V of frequency $f_c - f_v$.

If, as in practice, the modulating signal is a speech signal lying within the band 200 to 4,000 cycles, and if the carrier has a frequency of, say, 20,000 cycles, then $f_c + f_v$ is the upper sideband (instead of side frequency) of 20,200 to 24,000 cycles, and $f_c - f_v$ is the lower sideband from 19,800 to 16,000 cycles.

Each of these sidebands contains *all* of the signal information to be transmitted, and in modulation this information has been translated, or moved, from the originating voice-frequency band to a new, and higher, carrier-frequency band. For simplicity, in the discussions that follow, the modulating signal will be a single frequency of 500 cycles, rather than a band of frequencies. Also, the term sideband, rather than side frequency will be used.

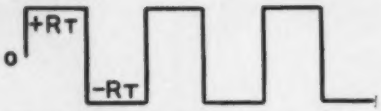

Fig. 3. Variations in transfer resistance for *Fig. 2*. These variations occur at the carrier-frequency rate.

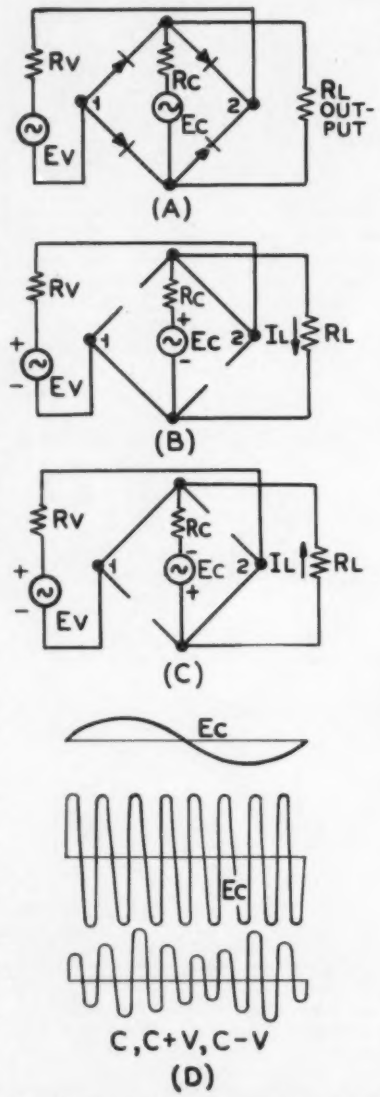

Fig. 2. The principal components in the output wave are the carrier and two-side frequencies, or sidebands.

Explanation of modulating circuit

An analysis of the modulation circuit of *Fig. 2* can be made as follows: As has been explained, the magnitude of the carrier voltage greatly exceeds the magnitude of the voice voltage.

Thus, the carrier voltage controls the switching of the bridge varistors, and hence controls the direction of the current I_L that the voice signal voltage E_v causes to flow through load R_L.

Actually, E_v controls the transfer resistance *between* E_v and R_L. The word "transfer" is used because E_v and I_L are in different parts of the circuit. The transfer resistance between source E_v and load R_L is $R_T = E_v/I_L$. To find R_T an equation must be written for I_L. The current that the voice voltage sends into the circuit is $I_v = E_v/(R_v + R_e)$, where R_e is the equivalent resistance between points 1-2, and $R_e = R_cR_L/(R_c + R_L)$. The voltage across R_e is $E_e = E_v - I_vR_v = E_v - E_vR_v/(R_v + R_e) = E_vR_e/(R_v + R_e)$.

The output current through R_L is $I_L = E_e/R_L = E_vR_e/(R_vR_L + R_cR_L)$. The transfer resistance between E_v and R_L is

$$R_T = \frac{E_v}{I_L} = E_v/\left(\frac{E_vR_e}{R_vR_L + R_cR_L}\right) = \frac{R_vR_c + R_vR_L + R_cR_L}{R_c}.$$

In the last step, $R_cR_L/(R_c + R_L)$ was substituted for R_e.

Because the sinusoidal controlling carrier voltage E_c switches the circuit as shown in *Fig. 2B* and *Fig. 2C* and causes the output current I_L to reverse and vary between $+I_L$ and $-I_L$, the transfer resistance is, in effect, caused to vary between $+R_T$ and $-R_T$.

If a constant source of voltage, such as provided by a battery, is substituted for E_v of *Fig. 2*, the current that would flow through R_L is as shown in *Fig. 3*. Since, in general $I = E/R$, or $I = EG$, it can be considered that the transfer conductance $G_T = 1/R_T$ varies, or alternates, between $+G_T$ and $-G_T$, at a frequency determined by the carrier frequency f_c.

Thus the instantaneous value of the transfer conductance follows the equation of the "square wave" of *Fig. 3*, and is

$$g_t = \frac{4G_T}{\pi}\left(\sin\theta + \frac{1}{3}\sin 3\theta + \frac{1}{5}\sin 5\theta + \text{----}\right)$$

Only the first term of this equation need be considered to show that side-

(Please turn to page 47)

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The Old-time Foreman has Disappeared and With Him has Gone a Tradition

LEFT: Typical crew members when "old Dobbin" furnished the horsepower.

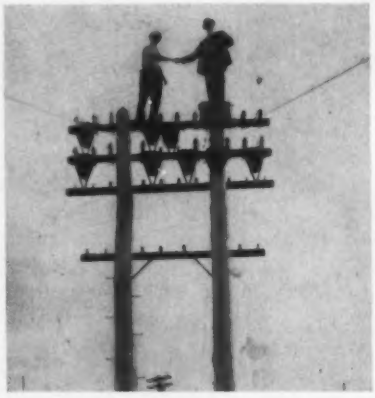
"The King is Dead— Long Live the King"

By GILBERT R. BRACKETT

A GREAT change has come over the hiring of people during the past several decades, especially by telephone companies. Not too long ago a construction foreman did his own hiring. He chose men for his crew who could perform and accomplish their work, regardless of their education or community status. His methods of selection came from intuition and not from books. A lineman approached him for a job, and if the prospect answered a few key questions properly, he was told to strap on his "hooks" and demonstrate. The shrewd foreman could tell within the hour whether the man was as capable as he claimed to be. If he proved himself his name went on the payroll, if not he received his "walking papers" and was told to "hit the road." It was that simple.

The construction foreman of the early 1900's was a self-sustained individual. He was as hard as a log of ironwood and could better the best man in his crew, whether in performance of his work or in a brawl. He took his liquor straight and asked concession from no man. He knew his job inside out and could smell a shirker a mile away.

He could be rough and tough when need be but as gentle as a woman if the occasion required. The doughty fellow watched over his brood like an old-biddy hen. He fought for his men when they were in the right and damned them when they were not. He was a czar on the job, but fair in all his dealings with his men. His word was law and he brooked no interference from the men nor from the office. He demanded a day's work from each of his crew, but was never a "slave driver."



The foreman of yesteryear knew his job. He was a perfectionist. Every pole

ABOVE: When the crew was stretched over a great distance, the foreman often used a horse to watch over the job.

Left: Sometimes, in the old days, crew members were "show-offs."

BELOW: The typical construction foreman of the early 1900's.

hole had to be dug just right, a certain depth and circumference, according to the size of pole it was to support. He could line up a stretch of poles with transit accuracy, each pole not a fraction of an inch off alignment. He could determine from the ground the proper wire sag between pole spans. He was a "jack" of all construction trades and a master of them, too.

Usually he enjoyed fun and seldom complained of the jokes played on the "grunt" or apprentice. He grinned his appreciation when a ribbing took hold and the grunt departed in search of a "bucket of liquid amperes," a "left-handed screw driver," or one of the other many false contraptions born in the mind of his crew members. It was merely an initiation of a new member.

The crew was a polyglot of men, an odd assortment of individuals who were as rugged as "the old man," himself. They worked hard and they played hard. Floaters from every state in the union most of them were, but they knew the construction business. They usually followed the geese, migrating south at the first sign of frost, returning north when the first days of spring replaced the snows.

They knew no inhibitions. Most of them were girl conscious, but few ever remained in one place long enough to get married.

I recall one itinerant lineman who worked with a Minnesota crew. Each fall he disappeared only to reappear at the same place when the summer crews were recruited. He was an exceptionally good lineman, and an Irishman who loved his joke. One big difference between him and the average "floater" was that he followed telephone construction work only during the summer months. When the air grew frosty he hurried to the south where he became a snake charmer, working in carnivals and side shows as such.

"Slip-Stick Artists" Unwelcome

This man held no fear of snakes, poisonous or otherwise. Woe to the neophyte who joined his crew, especially if the new man carried a lunch pail. At noon, when the newcomer opened his lunch box, he would let out a yell, as a young garter snake reared his head above a ham sandwich. But after losing several "grunts" through fright, the foreman called a halt to such capers. Shortly thereafter, the crew jester disappeared and the crew regained its lost nerve.

Many of the old-time foremen carried nickel plated connectors when not working—"Sunday utility tools" they called them. But, they were used for an entirely different purpose than intended. They quieted recalcitrant crew members when, after an especially hard week, they let off steam and became unruly. He also used them to help these same men when attacked by local swains that ganged up on the crew members, who had had the temerity to steal the local belles and tried to revenge the indignity.

The foreman's biggest headache was the "slip-stick" artist, the engineer who brought along a slide rule in his brief case and used it to determine the crew requirements and the amount of work that should be accomplished. "How the h—— can a guy like that know what I'm going to be up against," the foreman lamented. "Rough, stony land; a mess of tree trimming; fellas quitting without notice; (he had a thousand and one reasons); could slow down a job. Them slip sticks can't tell no one that!"

The foreman was "king-bee" at a pole climbing contest, usually held during a company picnic. He would pick out his most likely crew member and train him on the intricacies of the contest. He would then bet his last dollar on the man's dexterity. Often he entered the contest himself and rang the bell at the top of the pole with a speed that brought gasps from the onlookers. After the contest he would lose interest in the picnic and, if there was a saloon nearby, he would join other construction men there and swap experiences over a five-cent mug of foaming lager.

Handy With Fists

A foreman was never reluctant to prove his point, even though the proving might call for physical effort. He was as handy with his fists as with the tools of his trade. On one crew there was a lineman called Blackie, a really tough hombre from southern Texas. A good workman, but a bully. He made life miserable for other members of the gang. The foreman stood the obnoxious fellow just so long. He gave Blackie a sharp calling down in front of the crew. Blackie said nothing, but his eyes gleamed and his dusky face grew darker.

The next day Blackie was on a pole batting on a crossarm. The youngster who was helping him was just learning the business and was awkward on a pole. Finally, in disgust, Blackie told him to "beat it, skidoo off the pole and let a real man take your place."

The foreman had watched the whole affair. Blackie called to him, "What's the idea, sendin' up a punk kid to do a man's job? Ain't yuh got any real men in this gang?"

The foreman strolled calmly to the foot of the pole.

"I'll be your helper," he said softly. "I want to see what you can teach me. After I have learned my lesson you can get your pay from the clerk!"

Blackie didn't reply—he just glowered. The foreman stabbed his way up the pole in an easy, swinging fashion. He reached the top, snapped his safety about the pole and leaned back into the harness.

"Okay, teacher!" His voice was harsh. "You show me how the job should be done!"

Blackie glared at him, took out the handaxe from his tool belt slowly. He drew the axe back for a blow at the through bolt. With a quick motion the handaxe reversed in Blackie's hand and came down blade first on the foreman's safety belt. With a startled yell the foreman toppled backward. He landed on his back in the soft dirt at the base of the pole with a grunt that could be heard in Timbuktu.

Could Hold His Own

He slowly got to his feet, ignoring the offered help of the men nearby. He shook himself like a shaggy dog coming out of water and walked back to the pole. The grin that had been on Blackie's face turned to a scowl. Ten minutes later a battered Blackie was receiving his pay from the clerk and the foreman was shouting to the crew, "Okay! Okay! Get busy, you guys. The show is over!"

The average foreman could hold his own with the best in those days. Even so they were fair and humane. I have seen a foreman risk his life to reach a crew member at the top of a pole who had gotten crossed up with a hot wire, giving no thought to his personal danger. I have seen another shuck his tool belt, climbers and shoes and dive into the icy waters of a spring-swollen stream to save one of his men from drowning. I have known others who did not hesitate to dig into their own pockets in order to help a man or his family in distress.

In the early days, when a foreman grew too old to stand the rigors of a construction job, he became a wire chief of a small exchange. It was quite a transition for the poor fellow, changing from 9-inch pliers to the more delicate long nose pliers used in a central office. In construction work, he had had little difficulty diagnosing a transposition chart or a field plat but when it came to making sense out of a complicated switchboard circuit blueprint, he was lost.

The foreman and his crew performed best in an emergency. Sleet storms and floods called for every bit of knowledge and stamina they could muster. They

(Please turn to page 42)

ABC of the Telephone

by Frank E. Lee

OPEN WIRE lines are as common a sight along major highways as they are along a quiet country lane. Open wire lines are as much a part of the modern scene of everyday life as a space rocket poised on the trim orderliness of a launching pad. In fact, the open wire line with crossarms on every pole is probably the most recognized symbol of telephone communication.

The many types of cable plant, multipair distribution wire, and radio channels, may carry a lot of circuits—perhaps even approaching open wire in number of circuits and total length. Still, the open wire line and crossarm have been universally accepted as the symbol of man's conquering of distance by the modern convenience of telephone communication.

Open wire lines are far more than a symbol of telephone communication. They are a vigorous and highly important link in the entire telephone network. A closer look at open wire lines reveals there are interesting differences between various lines. A good example is found by considering some of the crossarms used on open wire lines.

Types of Open Wire Crossarms

There are a number of different types of crossarms, ranging from two-pin to 16-pin in size. Perhaps the easiest way to identify the various types is by the spacing of the drillings for the insulator pins.

As a general rule, approximately 16 inches of space is provided at the center where the crossarm is fastened to the pole.

Some of the various types of crossarms, illustrated in *Fig. 1*, are as follows:

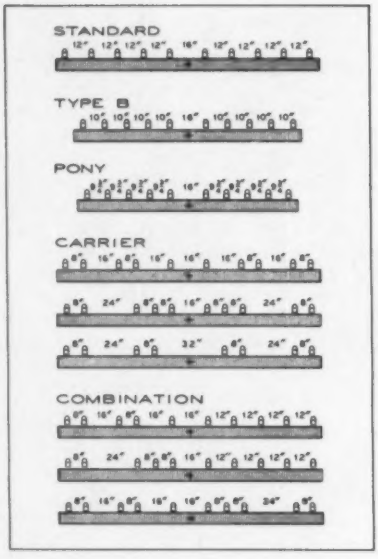


Fig. 1.

Standard: The standard crossarm has 12-inch spacing between the insulator pins.

Type B: Type B arms are a little shorter than the standard arm. Pins are spaced 10 inches apart on these arms.

Pony: Pins are spaced 9¾ inches apart on pony arms. These arms are quite appropriately named because they also have a smaller cross-sectional area than the rest of the crossarms.

Pony arms are generally used on exchange line feeder routes. This should not be interpreted that pony arms are always used on these lines. Instead, the pony arm would more likely be used on the branch or feeder route. Standard or Type B arms would most likely be found on the main or primary routes through the exchange area.

Carrier: There are many types of carrier crossarms. As a general rule, this designation is used if the crossarm provides for more space between circuits than between wires of a circuit.

Some of the various spacing arrangements are shown in *Fig. 1*.

Originally the designation "carrier crossarm" was used for the crossarm

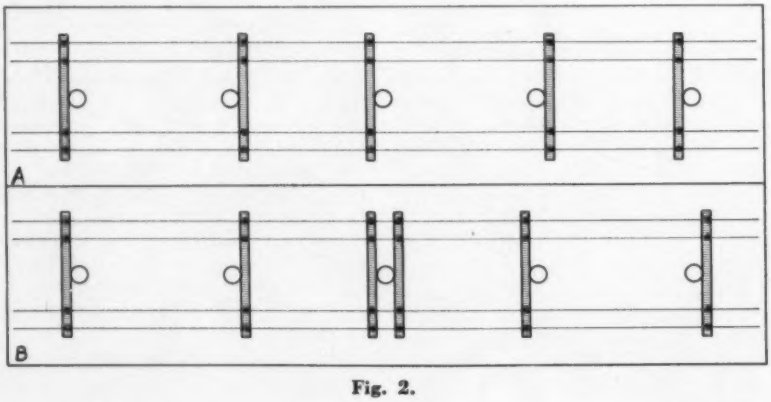


Fig. 2.

that provided 8-inch spacing between wires and 16-inch spacing between circuits. The center circuit has 16-inch spacing because of the clearance required for the pole.

Combination: Combination arms are used where carrier circuits may be placed on the same poles with exchange line circuits. The name can also be used for crossarms that provide various carrier spacings.

For example, one of the arms in *Fig. 1* has 8 inches between wires and 16 inches between circuits on one side and 8 inches between wires and 24 inches between circuits on the other side.

Initially the term "carrier crossarm" was used for a crossarm used on long-haul carrier circuits. In some respects the name is not as clearly descriptive as originally intended. Several carrier systems have been designed to operate successfully on exchange open wire lines where they may be less than 16 inches between circuits.

Expressed in another way, if a carrier line were being installed originally, crossarms with carrier spacing probably would be selected. However, replacement of standard, type B, or pony arms generally is not required if carrier circuits are being added to an existing exchange line.

Carrier circuits can usually be added to carefully constructed open wire lines without extensive rearrangement of the outside plant. This is another reason why open wire lines should be used in the outside plant wherever they are most advantageous.

Part 91. OUTSIDE PLANT CONSTRUCTION—Section 17. Brackets and crossarms for open wire lines.

Section 1. Planning of additions to outside plant (TELEPHONY, Nov. 17, 1956).

Section 2. Laying out the pole line, clearances to be maintained, and grading requirements (TELEPHONY, Nov. 24, 1956).

Section 3. Selection, treatment, handling, storage, and gaining of poles (TELEPHONY, Dec. 1, 1956).

Section 4. Items of power equipment used in pole line construction and maintenance. Also discussed are depth poles set in various types of soil (TELEPHONY, Dec. 8, 1956).

Section 5. Purpose of guy wires and factors involved in their proper placement (TELEPHONY, Feb. 16, 1957).

Section 6. Types of guy wires, how to determine guy loads, and the selection of guy strand (TELEPHONY, Feb. 23, 1957).

Section 7. Selection and installation of anchors (TELEPHONY, Apr. 27, 1957).

Section 8. Selection and installation of anchors—continued (TELEPHONY, May 4, 1957).

Section 9. Installation of new cable facilities—lead and plastic (TELEPHONY, Sept. 14, 1957).

Section 10. Installation of new cable facilities—lead and plastic (TELEPHONY, Mar. 8, 1958).

Section 11. Methods used to fasten aerial cable to messenger strand (TELEPHONY, Aug. 9, 1958).

Section 12. Methods used to fasten aerial cable to messenger strand —continued (TELEPHONY, Aug. 16, 1958).

Section 13. Application of lashing rods, lashed cable supports, and typical aerial cable arrangements (TELEPHONY, Apr. 25, 1959).

Section 14. Self-supporting cable and wiring at aerial cable terminals (TELEPHONY, May 2, 1959).

Section 15. Open wire lines in the telephone plant (TELEPHONY, Aug. 22, 1959.)

Section 16. Open wire lines in the telephone plant—continued (TELEPHONY, Aug. 29, 1959).

Location on Pole

Strengthening the pole line by placing crossarms on alternate sides of successive poles along the line is an interesting characteristic of open wire line construction. In most instances the pattern is as illustrated in *Fig. 2A*. This arrangement stabilizes any strain or pull that may be developed parallel with the direction of the line.

For example, if the pull were to the left in *Fig. 2A*, the strain would be alternately against a through bolt, a pole, a through bolt, a pole, and so on down the line.

A pole can be equipped with dual crossarms whenever additional stability is required along a line. A pole with a dual crossarm is shown in *Fig. 2B*.

Gaining Poles for Crossarms

A gain is cut in a pole where a crossarm is to be installed. To make a gain, a small section, approximately one inch, of the pole is cut away. The bottom of the gain is smoothed to a flat surface. This provides a shoulder to anchor the crossarm when the through bolt nut is tightened.

With a gain, the crossarm can be

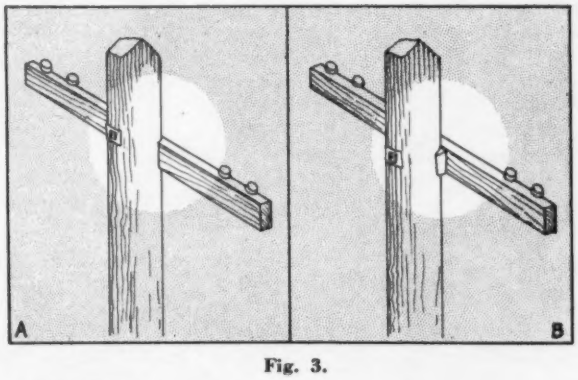


Fig. 3.

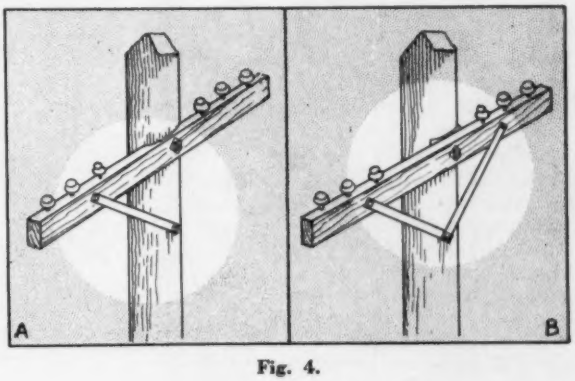


Fig. 4.

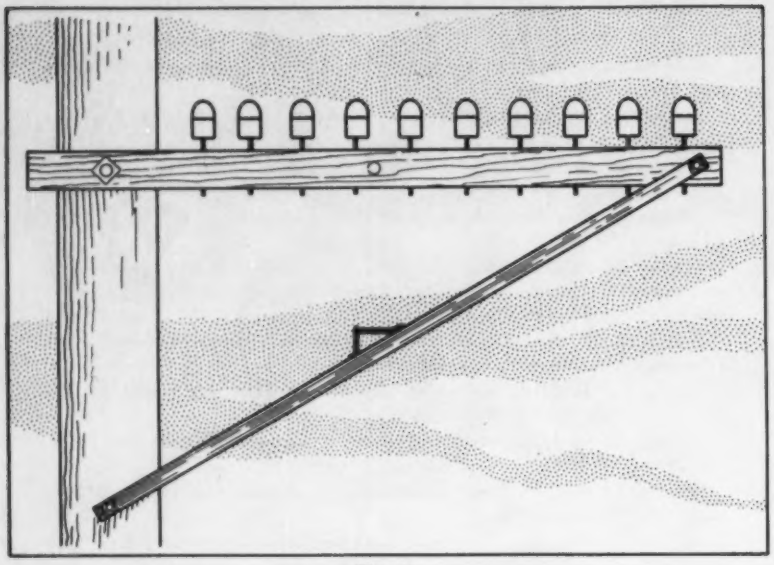


Fig. 5.

rigidly attached to the pole. Without a gain, the crossarm would have a tendency to teeter back and forth because of the small point of contact between the crossarm and pole. A typical crossarm installation with the gain cut into the pole is illustrated in *Fig. 3A*.

The only purpose of a gain is to provide a flat surface to help lock the crossarm in position. A flat surface for the crossarm can also be provided by using a metal pole gain as shown in *Fig. 3B*. The metal pole gain is formed with a rounded surface to fit the pole and a flat surface to accommodate the crossarm. The end result is the same as if a gain were cut into the pole.

There is little to choose between the cut or the metal gain. The cost of the metal gain is probably about the same as the cost of cutting the gain in the pole. The surface of the pole is damaged less with the metal gain. This is bound to have some long-range advantages over cutting a gain in the pole.

Braces Hold Crossarms

A steel brace is used to keep the crossarm at right angles to the pole. In many instances, a single brace, as illustrated in *Fig. 4A*, is sufficient. The brace holds the crossarm rigidly in place because the ends of the arm cannot swing either up or down.

Two braces may be used quite often on crossarms, as shown in *Fig. 4B*. This arrangement distributes the load because the crossarm is braced in two places instead of one. The load on the two steel braces is the same as the load would be on one brace. However, there is less possibility that the crossarm will split under a heavy load when the bracing strain is equalized between the two ends of the crossarm.

Braces also can be used to add to the flexibility of an open wire line. For instance, in some locations there may be an advantage in placing the crossarm on one side of the pole as illustrated in *Fig. 5*. Construction variations of this kind to avoid needless trimming of ornamental trees help improve customer relations.

An unbalanced load is not recommended as a usual thing for any pole line. However, when used only as required, variations of this type have little effect on the stability of the line as a whole.

Side guys can be used as near to the offset section as practical if there is any question of weakening the structural strength of the line.

Crossarm Pin Numbering

Crossarm pins are numbered to make the open wire circuits easy to identify any place along the line. As a general rule, crossarm pins are numbered from left to right facing along the line in the direction of increasing pole numbers. If the poles are not numbered, this would be in the direction set up for that section of line.

In most cases the lowest numbered poles will be nearest the central office. In this way the pole numbers will increase as the line is extended away from the central office.

A typical numbering system for the various sizes of crossarms is as follows:

2-pin crossarm:

5-6.

This is the same as if these were the

(Please turn to page 48)

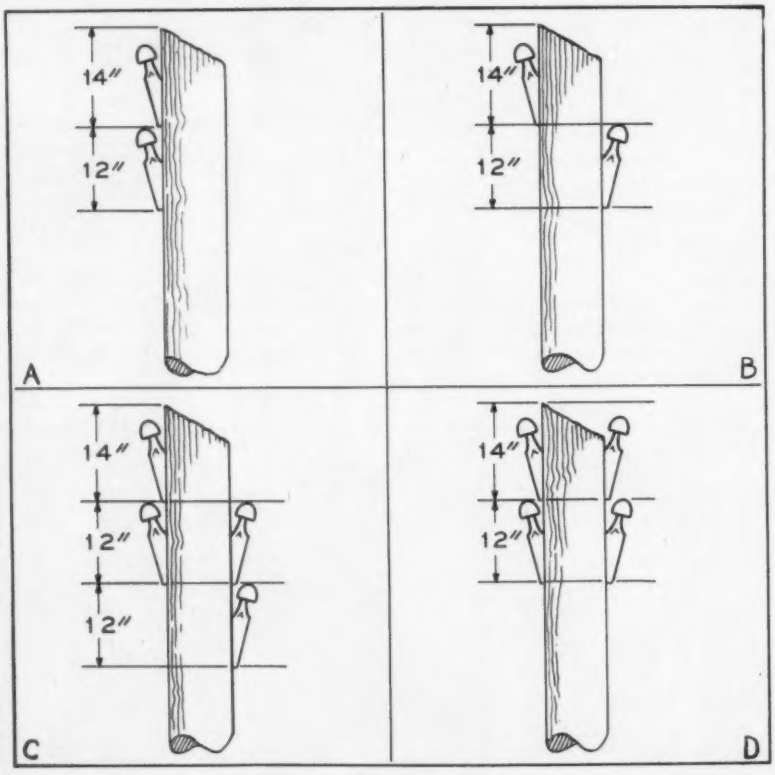


Fig. 6.

today's

Highlights

of finance-taxes-business trends

by Willard F. Stanley

BOND MARKET RALLY--Up to about July 21, the bond market had been slipping softly downward, with the latest yield on an offering of double "A" rated bonds around 4.95 per cent. An adverse factor was uncertainty over the outcome of the federal Treasury's large mid-July financing program.

As soon as this financing closed (on July 20), it became evident that in fixing their rate at 4.75 per cent, the Treasury had drastically underpriced the 13 and 60-month federal securities they were offering. A scramble for these securities ensued, causing a considerable rally in Federal government securities which was participated in by corporate bonds. Early in August, a double "A" rated utility issue was successfully offered on a 4.85 per cent yield basis.

But more good news was to come. About mid-August, it was announced that the Ways and Means Committee of the House of Representatives had refused to vote favorably at this Congressional session on the bill permitting the federal Treasury to pay higher interest than 4¼ per cent--the present legal limit for bonds due in more than five years.

This was taken as eliminating any chance of an attempt at "stretchout" of federal maturities this year (i.e. substituting long-term for short-term securities). It's true the Treasury could get around the law by issuing 4¼ per cent long-term bonds at a discount, which would bring their yield up to the then-current market level, but it's considered highly unlikely that the Treasury would follow this procedure under existing circumstances.

Reflecting this favorable factor, during the week beginning Aug. 17, a double "A" rated issue was offered at a 4.80 per cent basis and immediately before that, a triple "A" rated bond at 4.61 per cent basis--lowest for a considerable number of months.

Somewhat strangely, the bond market rally isn't confirmed by the Wall Street Journal's tabulation, which, at Aug. 22, showed that average yields on the basis of bid prices of twelve new public utility funded debt issues was 0.02 per cent per annum (two decimals) higher than the average yield on these securities at their original offering prices, although seven issues showed lower yields on the current bid basis.

Just in the last week as this is being written, however, (Aug. 25) there have been symptoms that the bond market may have overdone itself in its upward movement and that a technical correction is forthcoming. Government securities slipped back considerably, and 90-day Treasury bills brought as high as a 3.54 per cent return.

Also, with business still booming, there exists the threat of the Federal Reserve Board further increasing rediscount rates. But one of the two principal "overhanging" fears has been eliminated as a practical matter for the balance of 1959 (i.e. fear of "stretchout"), although the other fear, (i.e. possibility of rediscount rate rise) still remains.

Best advice indicates the improvement in bond yields is fundamentally of a temporary nature and probably will not change the long-range upward trend in interest rates brought about by continued demands for money by reason of the business boom.

Therefore, those issuers who have bond financing to do soon, might be wise to move as promptly as possible and endeavor to "get in" on the benefits of the present

(probably temporary) reduced yields. Total change from the June peak to the Aug. 13 offering above mentioned, has been something over a quarter of a percentage point of yield (0.25 per cent per annum). While this is a welcome break in the lengthy trend in the opposite direction, we don't feel it warrants accelerating offerings long before the time the funds are needed.

Obviously, deferral in normal scheduling of funded debt offerings would seem unwise at this stage.

* * * *

COMMON STOCK OFFERINGS MORE STRONGLY INDICATED--Last month reference was made to a tabulation of price-earnings ratios for 190 utilities, which, for July, averaged about 16.7. August figures from the same source (G. A. Saxton & Co., investment dealers of New York City) show this average price-earnings ratio has increased to 17.3.

This is equivalent to a common stock money cost to the issuer, before sales expense, of around 5.78 per cent. It seems hard to go wrong in issuing stock at such a level. Maybe this level is there to stay or will be exceeded. Then again, maybe not.

At any rate this latest average price-earnings ratio represents a 30-year top, except for something over 18 times shown for February of this year--true peak for three decades.

* * * *

COMMON STOCKS STAGGER A BIT--The period from July 21 to Aug. 25 was not kind to stock speculators. Drastic declines occurred in many "space-age" and electronic-type glamor stocks which had experienced wholly unjustified run-ups to fantastic price levels.

One such stock, for instance, immediately before the violent price break on Monday, Aug. 10, was selling at 60 times earnings--not depressed recession earnings, but peak earnings for current periods reflecting high levels of prosperity. After Monday it was still selling at 40 times these earnings. Many of these stocks have rallied considerably since, but practically all of them suffered percentage losses far transcending those shown for the accepted "averages."

While still substantially ahead of the Dec. 31, 1958 level, the New York Times average of 50 combined stocks, at Aug. 25, showed a decline from the July 21 close. The steel strike doesn't seem to have been an important factor in the declines, but as this is written there still exists a deadlock which may continue for a protracted period.

The Aug. 25 close, as registered by the Times average, was 22, 44, and 12 per cent above the same average at the close of the years, 1956, 1957 and 1958, respectively.

It's anybody's guess where prices go from here, but it does seem that the power of the upward movement may have been temporarily abated. Perhaps a resting spell will bring to American investors a more realistic appraisal of present and prospective earnings and of their values in market prices.

Utilities still seem the "natural" investment in this market, both for defense, if drastic declines should occur, and for moderate improvement if things remain on an even keel.

* * * *

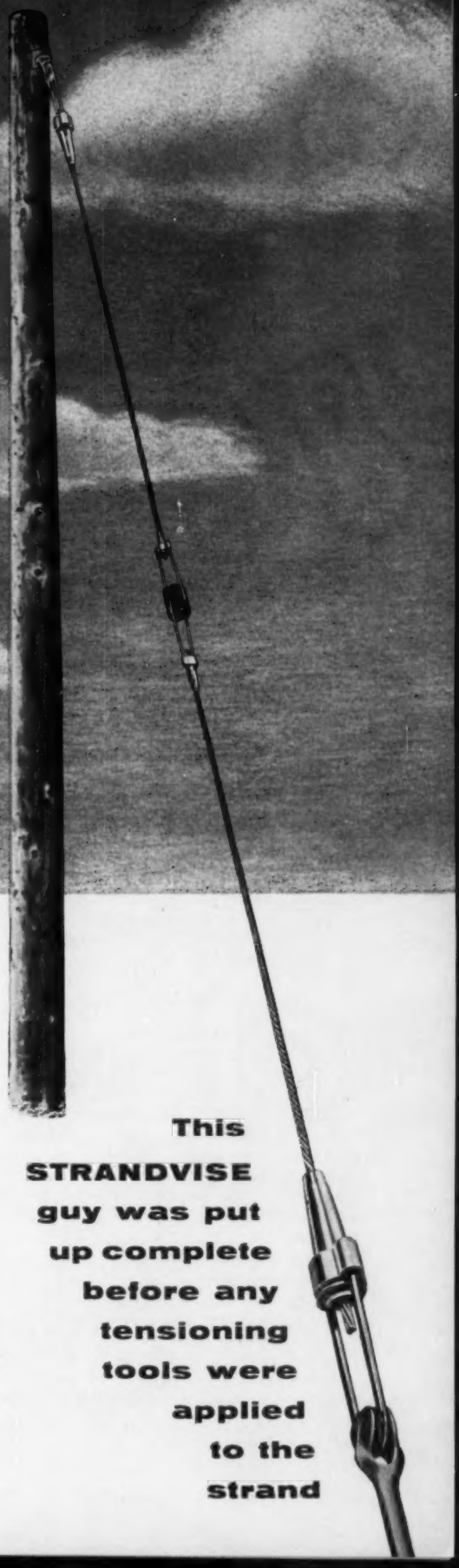
RECORD EVERYTHING CONTINUES -- According to the August letter of First National City Bank of New York on business and economic conditions, practically all indices reflecting the nation's activities and income are still showing all-time peaks--including employment, personal incomes, retail trade, automobile sales, (except for 1955), new homes, and other indices.

It's evidently too soon for the steel strike to affect the economy. Just what the outcome of a strike of 90 days or more would be is difficult to predict. Certainly the steel areas would feel the pinch of reduced spending and this would be accentuated if the strike lapped over into other industries depending on steel for continued operations.

The bank's analysis of over 800 corporation earnings statements for the June 30 quarter and first half of 1959 show an average 15 per cent above the preceding quarter and 67 per cent higher than the depressed second quarter of last year. For the half, earnings were up 56 per cent over last year's recession level. Seven out of eight companies shared in the increase.

Where Is the Guy who put up this guy?

He's doing something else—
maybe he's putting up another one.
Anyway, he did this job all alone
in less than five minutes—
by himself.



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Mr. Reliable:

WE DON'T BELIEVE IT BUT—we want to give STRANDVISE a fair trial. You may send 4 of them size ( ) without charge. Better send your instructions for installing and a catalog-price sheet, too.

Signed_____

Company_____

Street No._____

City_____ State_____

This STRANDVISE guy was put up complete before any tensioning tools were applied to the strand

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

MANY operating companies are successfully using installers and troublemen as salesmen for color sets and extensions. This program has proved extremely successful in many areas. Various methods have been used in certain cases to exert pressure on these salesmen and some of these appear to border on the obnoxious.

Score boards are kept and individual records are maintained on each man and foreman. Periodic meetings are held to scare the laggards into greater sales effort.

It would appear that an incentive plan of some sort would prove more effective and at the same time promote better employe-employer relations.

For example, why not give a day off with pay to the men who sell a specified number of units? Or, give them the equivalent money value of the first month's rental for each unit sold.

This would insure maximum sales effort from the installers and trouble shooters and would certainly prove a good investment for the telephone company.

•

Buildings constructed for the housing of central office equipment are often not designed for expansion, under circumstances in which a company is required to increase the size of the system.

Often no thought is given to building changes, and when an addition is required, it can only be provided at an excessive cost. The unplanned-for addition sometimes is an unsightly structure, too.

Recently we examined plans of a typical building designed to house all types of dial switching equipment. This building had a ceiling height of 14 feet and was arranged so that additions could be provided at a minimum cost if the company were required to increase the size of the basic system.

Certainly this arrangement should prove most desirable, because forecast studies mean very little in this age of rapidly expanding communications.

•

A small first-aid kit, not much larger than a book of matches, is now available. This kit contains, in addition to first aid instructions, several small plastic bandages, and antiseptic packets. Space on the cover can be utilized for advertising material.

This would undoubtedly prove a valuable public relations asset for any operating telephone company.

•

Egotism is described as the art of seeing qualities in yourself which others can't see.

•

In San Francisco, Cal., 200 fire department drivers have completed a safe driving course. This course is based on the Pacific Telephone & Telegraph Co.'s "Defensive Driving Program" that has won the praise of the San Francisco chapter of the National Safety Council.

The program is designed to speed up driving skills and responses to insure that fire trucks answering an emergency call will pose a minimum of risk to the public and the firemen themselves. A total of eight men a day are taking the course.

•

We have recently checked with many of our friends to learn how many telephone numbers they have memorized. With the majority, two numbers are all that they have bothered to memorize, i.e., their home and office numbers. Obviously, people rely on list finders for their frequently called numbers.

•

We note that cut-overs at the present time are not the Roman holidays they were in the past. Usually, there is entirely too much confusion, even in a well-planned cut-over, to allow for any additional concern over visitors.

Moreover, something may go wrong and in such an event, corrective action may prove much easier without an audience.

It is believed that the plan commonly used at the present time to hold an open house a week or more after the cut-over proves most desirable. This results in less confusion and permits more people to view the new exchange.

•

Watching an expert bricklayer is always fascinating. They make every movement count and the manner in which they line up bricks to build a straight wall is an operation we are never quite able to understand.

While observing a worker recently we inquired as to how many bricks he could lay in a day. He stated that 800 was an average day's work for him. We informed him that we were familiar with the construction of a communication building in which each man layed only 400 bricks daily. He replied: "Yes, but they were union men."

So it seems that in this case the union bricklayers lay 400 bricks a day at the $4.00 an hour rate. The non-union man lays 800 a day and draws $3.75 an hour.

•

John D. Dresser, of Detroit, Mich., visited our Virginia home when the Blain family happened to all be absent. He left the following note:

Venetian blinds down tight,
Altho no longer night;
No answer to his telephone
Persuaded me he must have flown;
And the news upon the step, limp,
Alone, and without pep,
Supported my contention
He was off to some convention,
Or perhaps a phone man's vacation
In line with his vocation.
Anyhow, he was not there,
But I can't say, "I didn't care"!

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11302 medium molecular weight black, with non-discoloring antioxidant; for line and drop wire insulation, weather-resistant primary and support wire insulation, general purpose jacketing.

12203 high molecular weight natural, with non-discoloring antioxidant; primary insulation for telephone, power, and control cable; insulation requiring superior toughness, maximum stress crack resistance.

12253 medium molecular weight natural, with non-discoloring antioxidant; for primary insulation for coaxial cable, power cable, telephone cable, and general insulation use.

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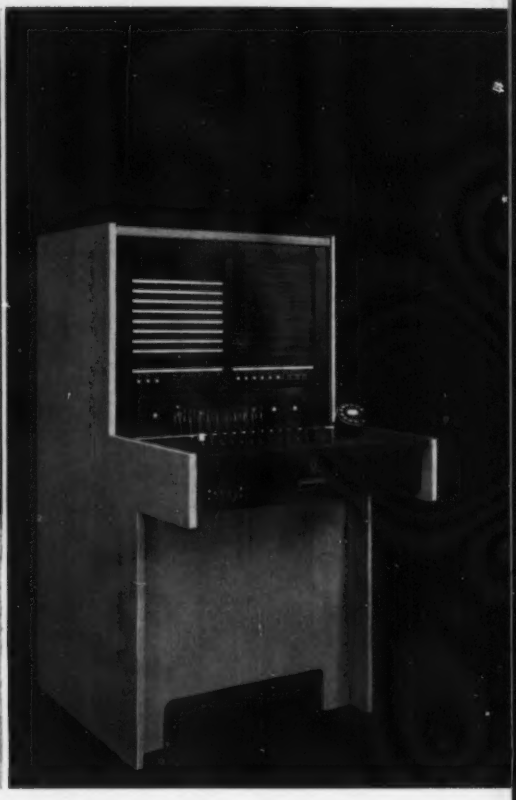
increase your



Compact attendant cabinet for use with AE P-A-B-X systems. Uses less space than a typewriter! Two-tone grey finish blends into the color of any office.

Floor-type attendant cabinet for use with our larger P-A-B-X systems. Choice of Cinnamon Blonde (shown above) or Dark Mahogany finish.

P-A-B-X sales!

Modern dial phones are used with AE P-A-B-X systems. Offered in a choice of 10 decorator colors.

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YOU GET STOCK DELIVERY ON 6 P-A-B-X MODELS!

AE stocks a P-A-B-X board to meet every need of your subscribers. This means you can offer businesses, large and small, a ready-made P-A-B-X system. It means you can give quick service, too!

YOUR CUSTOMER GETS TOP QUALITY!

The backbone of AE P-A-B-X boards is quality. Components are identical to those used in the famous Strowger central office equipment. That's why telephone companies find AE P-A-B-X boards provide dependable service and minimum maintenance.

YOUR CUSTOMER GETS OPTIONAL SERVICES!

AE offers 15 auxiliary services for P-A-B-X systems. These optional features provide additional service for your subscriber — and extra revenue for you! Ask for further information on our complete line of P-A-B-X auxiliary services.

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Prepared by P-A-B-X sales experts. Includes selling plan, complete catalog, sales promotion folders, mailing piece, suggested sales letters, sample survey form and proposal—even a sample contract! To get your free kit, write Automatic Electric Sales Corporation, Northlake, Illinois. In Canada, Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16.

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GENERAL SYSTEM

Impact of Telephone Communication

On the Economies of the Various Geographic Regions of the U. S.

By ALEXANDER I. WARRINGTON

PART VIII. Region 8. The Far West—Washington, Oregon, Nevada, and California.

The Far West

THE PER CAPITA income in 1956 was 2,312 dollars, and this was about 400 dollars above the national average. In 1939 the per capita income was 728 dollars. The increase for the 1939/56 period was 217.5 per cent. The (a) estimated population and (b) households, both in millions, were: (a) 1956, 17.4 and 1939, 9.8, an increase of 77.7 per cent; (b) 1956, 5.6 and 1939, 3.0, an increase of 84.1 per cent.

Expressed also in millions, there were in 1956, 7.7 telephones of which 30.7 per cent were for business; and in 1939, 2.2 of which 37.2 per cent were for business. The percentage increase in totals was 241.4.

Expressed in thousands for (a) manufacturing establishments and (b) employment, the following is noted: (a) 1939, 16.3 and 1900, 8.3. (The comparative newness of this region is the explanation for the increase.) (b) 1956, 1,556.0; 1939, 524.7; and 1900, 133.8. Percentage increase in employment was 300.0.

(a) Payrolls and (b) value added by manufacturing are as follows in millions of dollars: (a) 1956, 7,758.0; 1939, 786.4; 1900, 74.7; (b) 1956, 13,944.0; 1939, 1,558.2; 1900, 141.2.

In 1958 total telephones were in thousands: 8,238.4 with 2,503.0 for business, and 5,735.4 for home use.

The personal income was 44,955 million dollars in 1957.

The states with the highest percentage employment concentration in various types of industries are shown below for 1958:

Type of Industry	*State*
Mining	Nevada
Contract construction	Nevada
Manufacturing	Oregon
Transportation and other public utilities	Nevada
Trade	California
Finance, insurance and real estate	Washington
Service and misc.	Nevada
Government	Washington

Washington

The per capita income in 1956 was 2,022 dollars and in 1939 it was 617 dollars, an increase of 227.7 per cent. The (a) population and (b) households, both in millions, were: (a) 1956, 2.5 and 1939, 1.7, an increase of 48.0 per cent; (b) 1956, 0.8 and 1939, 0.5, an increase of 52.5 per cent.

Telephones, in millions, numbered 1.0 in 1956 with 28.6 per cent for business, and 0.3 in 1939 with 34.7 per cent for business. The increase in totals was 203.2 per cent.

In thousands, there were 2.8 manufacturing establishments in 1939 and 1.9 in 1900. Employment in 1956 was 213.0; in 1939 it was 99.1; and in 1900, 33.6.

In millions of dollars, payrolls ran 1,051.0 in 1956; 142.5 in 1939; and 19.1 in 1900. Value added by manufacturing was: 1956, 1,942.0; 1939, 267.7; and 1900, 32.5.

Total telephones, in thousands, in 1958 were 1,063.3, with 302.7 for business and 760.6 for home use.

The personal income was 5,792 million dollars in 1957.

Employment followed the distribution shown below for 1958:

Type of Employment	*Percent Distribution*
Total employment	100.0
Mining	0.3
Contract construction	4.5
Manufacturing	27.8
Transportation and other public utilities	8.1
Trade	22.8
Finance, insurance and real estate	4.8
Service and misc.	11.4
Government	20.3

Oregon

The per capita income was below that of the region and the nation, or 1,908 dollars in 1956, and 582 dollars in 1939.

The increase was 227.8 per cent. In millions, the population in 1956 was 1.6, and 1.0 in 1939, an increase of 53.1 per cent. There were 0.5 households in 1956 and 0.3 in 1939, an increase of 58.4 per cent.

Telephones, also in millions, amounted to 0.6 in 1956, of which 28.3 per cent were for business, and in 1939 the total was 0.1, of which 34.9 per cent were for business. The increase in totals was 215.4 per cent.

In thousands, there were 1.9 manufacturing establishments in 1939 and 1.4 in 1900; employment was 143.0 in 1956; 67.2 in 1939; and 15.6 in 1900.

In millions of dollars, payrolls in 1956 amounted to 663.0; in 1939, 87.9; and in 1900, 8.0. Value added by manufacturing in 1956 was 1,145.0; in 1939, 156.6; and 1900, 15.8.

Total telephones, in thousands, for 1958, were 629.7, with 177.2 for business and 452.5 for residences.

(Please turn to page 55)

Courts and Commissions

PUC Service Citations Overruled By Ore. Court

Marion County (Ore.) Circuit Judge Val D. Sloper has ruled that the West Coast Telephone Co., contrary to an order issued by former Public Utility Commissioner Howard Morgan, has met and "reasonably fulfilled an abnormally large demand for service" (TELEPHONY, Aug. 1).

The operating practices of the company, which serves 52,000 Oregon subscribers, had been challenged by former Commissioner Morgan after the company had filed for a rate increase.

Judge Sloper ruled that certain portions of an order issued by Morgan dealing with so-called substandard conditions maintained by West Coast should be vacated and set aside. The court said West Coast was entitled to costs and disbursements.

This decision exonerated the company from Morgan's charges that it had failed to pursue a service improvement program.

West Coast had filed an application for an $834,660 rate increase in 1958. The former commissioner allowed $440,000.

The company challenged the order in court, but later abandoned the portion of its petition demanding the full $834,660 increase. It said that improved economic conditions and other factors made the full increase unnecessary.

Reject Cal. Utilities Tax Assessment Protests

A protest by several large utility companies in California, including Pacific Telephone & Telegraph Co., that the state was assessing utility property much higher than other types was rejected recently by the California Board of Equalization.

The board stuck to its previously determined assessment figures for the 1959-60 property tax despite the protests.

The utility assessments throughout California were reported to total a record 3.6 billion dollars with the result that the companies will pay more than 225 million dollars in taxes to cities and counties in which their holdings are located.

Ark. Court Dismisses Review Of General of SW Raise

A petition for review of a $203,652 rate increase granted by the Arkansas Public Service Commission to the General Telephone Co. of the Southwest was dismissed in Pulaski County (Ark.) Circuit Court on Aug. 13 (TELEPHONY, July 18).

The city of Texarkana, Ark. had appealed the increase granted on May 14 by the Arkansas Public Service Commission. In dismissing the petition for a review of the increase brought by the Arkansas city, Judge John M. Lofton Jr. of the Pulaski court ruled that the commission had not violated the city's rights in its action.

Rates affecting subscribers on the Texas side of the city are involved in city council and court proceedings in Texas.

Texarkana, Ark. has 30 days from Aug. 13 in which to decide whether to appeal to the Arkansas Supreme Court, and City Attorney LeRoy Autrey said the matter is being studied to see if there are grounds on which to base a possible appeal.

Pending outcome of a possible appeal and of city council and court proceedings, General of the Southwest is charging its new rates in Texarkana, Tex., under agreement to make refunds in the event the two cities win their cases.

Ill. Bell's Plastic Directory Cover Regulation Upheld

The Illinois Commerce Commission denied a recent petition for a rehearing of its Dec. 17, 1958 order upholding Illinois Bell Telephone Co.'s regulation against plastic covers being attached to its directories (TELEPHONY, Nov. 8, 1958).

A Barrington, Ill. company, Murphy Reier, Inc., which produces these covers and distributes them free to telephone subscribers, had accused the telephone company of trying to restrain competition.

Murphy Reier's covers carry paid advertising of business firms.

The commission had ruled that these attachments were harmful to telephone service because they publicized wrong numbers, interfered with the telephone company's own advertising and directions to subscribers and reduced the company's revenues from the sale of directory advertising.

United Asks EAS With S. Bell In N. C.; Exchange Rate Raise

United Telephone Co. of the Carolinas, Southern Pines, N. C., has asked the North Carolina Utilities Commission for authority to provide extended area service between its Kernersville exchange and the Winston-Salem exchange of Southern Bell Telephone & Telegraph Co. and to increase its rates at Kernersville to offset the loss of toll charges.

It estimated that with the elimination of tolls it would lose $42,183.17 and said the proposed new rates would bring in an additional $42,647.40.

It proposed these monthly increases: Business—one-party, $5.25; two-party, $4.75; four-party, $4.25; multi-party rural, $1.75. Residence — one-party, $1.65; two-party, $1.80; four-party and multi-party rural, $1.60.

In its petition, the United company said that in a recent poll in which 69 per cent of the subscribers voted, 67 per cent voted for toll-free service and increased monthly rates. It said Southern Bell has agreed to the extended area service and plans no rate increase at Winston-Salem, 11 miles away.

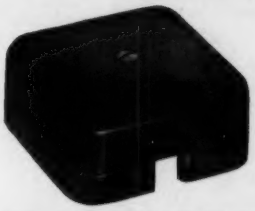
Approve Sale in Arkansas

The sale of the Louann Telephone Co., England, by Mrs. Thelma Beirne to J. A. Roe was approved by the Ar-

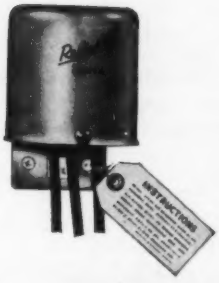
(Please turn to page 38)

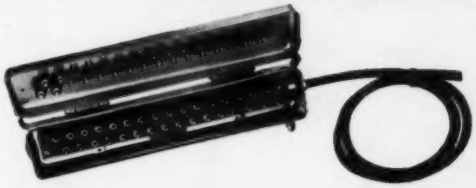
Terminals, protectors and associated equipment for any telephone operation are provided for you at our warehouses. You get famous brands like Reliable and Cook. In most cases, your order is picked from stock and shipped the same day it arrives in our warehouse.

Your supply business is important to us. We want to receive orders from you today...and for many years ahead. And, the best way we can do this is to give you *prompt delivery* from a *large stock* of *famous brands*. Next time you need terminals and protectors, give us a call. We'll stay up nights to prove—at AE, you get all 3.



TERMINALS AND PROTECTORS





Automatic's 5 friendly warehouses:

Northlake, Illinois	2915 Moore St. Richmond 21, Va.	2360 N. W. Quimby St. Portland 10, Ore.	158 Corliss Avenue Johnson City, N. Y.	2021 Main St. Kansas City 8, Mo.
Fillmore 5-7111	ELgin 8-9280	CApital 3-7244	SWarthmore 7-8507	HArrison 1-7575

AUTOMATIC ELECTRIC

Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

kansas Public Service Commission on Aug. 13 (TELEPHONY, July 18). The company provides magneto service to 90 subscribers.

General Granted $43,000 Out Of $237,000 Sought in W. Va.

The West Virginia Public Service Commission, effective Aug. 20, authorized $43,000 of the $237,000 in increased rates sought by the General Telephone Co. of the Southeast (TELEPHONY, Oct. 4, 1958).

The new rates will provide a 6.35 per cent return on the company's investment instead of the 7.5 per cent return sought.

The rates asked by the company have been in effect under bond since Dec. 5. The commission ordered the company to refund, at 6 per cent interest, the difference between the rates authorized and those sought.

File For Rate, Note, EAS OK In Ind.; Grant Requests

The Indiana Public Service Commission recently received the following petitions:

Prairie Telephone Co., Inc., Brookston, asked to increase rates and to issue $50,000 worth of mortgage notes.

Georgetown Telephone Co., Inc., requested permission to borrow $20,000 for rehabilitation of plant.

The General Telephone Co. of Indiana, Inc. and the Indiana Bell Telephone Co. asked to establish EAS between Indiana Bell's Alexandria exchange and General's Orestes exchange.

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The commission has taken action on the following requests:

It approved the request of United Telephone Co. of Indiana to issue $300,000 in promissory notes.

Midwest Telephone Co., Petersburg, was authorized to borrow $50,000 at interest not to exceed 6 per cent (TELEPHONY, July 25). The funds are to be used to cut over the Petersburg exchange to automatic operation.

The Southern Indiana Telephone Co., Inc., Aurora, was permitted to increase rates by $43,115.79 effective Oct. 1.

The new rates apply to the company's Aurora, Lawrenceburg and Guilford exchanges and are as follows:

Aurora and Lawrenceburg

One-party business	$7.75
Two-party business	6.25
Four-party business	4.75
Eight-party business	4.75
Multi-party business	4.75
One-party residence	5.75
Four-party residence	3.40
Eight-party residence	3.25
Multi-party residence	3.25

Guilford

One-party business	$4.00
Two-party business	3.50
Multi-party business	3.00
One-party residence	3.50
Two-party residence	2.50
Multi-party residence	2.50

The General Telephone Co. of Indiana was authorized to eliminate so-called "free" service between its Morristown and Carthage exchanges, Morristown and Arlington and Morristown and the Fountain exchange of the McCarter Telephone Co. (TELEPHONY, June 27). EAS will be substituted.

REA OK's Two Telephone Loans

REA loans made during the week of Aug. 24 will be used by the borrowers to improve service for more than 1,400 subscribers in Georgia and North Dakota. The loans were approved as follows:

Souris River Telephone Mutual Aid Corp., Velva, N. D.; (mailing address—Minot, N.D.); $7,655,000; Aug. 18.

A major portion of these funds will be used by the borrower to provide telephone communications equipment and plant to serve a SAGE installation at Minot Air Force Base, and a nearby radar site.

The balance of the funds will enable the borrower to accomplish the following purposes:

(1) Provide telephone service to 259 housing units at Minot Air Force Base.
(2) Provide service to 58 new subscribers in its existing Berthold exchange area.
(3) Acquire and convert to automatic operation the magneto facilities of the Deering Telephone Co.
(4) Complete previously authorized sections of its system.

A new automatic central office will be constructed at Deering. New facilities will enable the borrower to improve service for 67 subscribers served by the Deering company, and provide initial service to a total of 434 subscribers.

Upon completion of facilities provided in this and previous REA loans, the Souris River corporation will be serving 6,766 subscribers. Seventeen of its 24 exchanges have been cutover to automatic operation, and six more are scheduled for cutover this year.

Raymond Vendsel is president of the Souris River corporation, and Paul A. Froemming is manager.

•

Nelson-Ball Ground Telephone Co., Ball Ground, Ga.; $430,000; Aug. 21.

These funds will enable the borrower to furnish initial service to 939 subscribers in an expanded area. Facilities required include an automatic central office in a newly created exchange at Marble Hill. Funds are also included to replace the existing central office building at Nelson with a new one, remodel the present building for commercial purposes, and provide for an increase in the proportion of private and semi-private lines.

REA loans to this borrower now total $661,000 which will make possible new and improved service to 1,450 subscribers. The completed system will consist of exchanges at Marble Hill and Nelson. The latter is now furnishing dial service to approximately 800 subscribers.

Mrs. Onie S. Cook is president of the Nelson-Ball Ground company and Mr. James S. Cook is manager.

Ask Rate Raise in New York

The New York Public Service Commission on Aug. 26 took under advisement the rate raise request of the Hammondsport Telephone Co. The company serves about 833 stations. The new rates it is seeking will amount to an increase of about $4,000.

Ask Arkansas Incorporation

J. Curtis Shrum and Roma Jean Shrum, operators of the Madison County Telephone Exchange, Huntsville, on Aug. 22 were reported to have applied to the Arkansas Public Service Commission for authority to incorporate under the same name.

Approve $1,847 Increase For Wisconsin Independent

The Larsen Telephone Co. on Aug. 13 was authorized by the Wisconsin Public Service Commission to raise rates by $1,847 (TELEPHONY, June 6).

This raise will give the company a 6.5 per cent return on an investment of $81,410.

Approximately 90 per cent of the subscribers are rural residents and their rate will be increased from $3.25 to $3.45. Rural business rates will increase from $3.60 to $4.15.

Old and new urban rates are as follows:

	Old	*New*
One-party business	$5.25	$6.30
Two-party business	4.50	5.30
Four-party business	3.60	4.15
One-party residence	4.50	5.15
Two-party residence	4.00	4.40
Four-party residence	3.25	3.40

Manager Julius Jacobson said that this is the first increase the company has had since 1951.

The General Telephone Co. of Kentucky recently moved its staff of 200 employes and officers into this new office building in Lexington. President H. J. Heuther said the centralization of staff will make for greater efficiency of operation. Formerly, the General of Kentucky offices were in five temporary locations in the city. The new quarters, which are leased from Ruttenberg & Co. of Chicago, comprise 55,000 square feet of space. Architects were Brock and Johnson of Lexington; the general contractor was Foster Creighton of Nashville, Tenn. Design and decor of the new building are modern; it is completely air-conditioned and heating is furnished by a common heat pump system. Adjacent are a 15-car garage and parking facilities. The company's operation presently includes 48 exchanges serving 123,000 telephones.

Lane Hubbard Is Assistant To SBT&T President

Lane Hubbard, of Atlanta, assistant vice president, has been appointed assistant to the president of the Southern Bell Telephone & Telegraph Co., it was announced by President Ben S. Gilmer.

Mr. Hubbard, who has spent his 38-year career in Georgia, has been assistant vice president since 1954. Prior to that, he headed commercial operations over the state. Earlier he served as district manager for Atlanta.

LANE HUBBARD

A native of Hogansville, Ga., Mr. Hubbard was educated in high school there and at the Atlanta Law School. Mr. Hubbard attended law school while working for Southern Bell and was graduated in 1934 with the degree of bachelor of laws. He was admitted to the Georgia Bar and is a member of the Atlanta, the Georgia, and the American bar associations.

Telephone Pioneers To Meet Sept. 29-Oct. 1 in Cleveland

Cleveland and the Ohio Bell Telephone Co., will be host to more than 1,700 delegates and guests attending meetings of the 34th general assembly of the Telephone Pioneers of America on Sept. 29, 30 and Oct. 1.

Meetings, workshops and conferences are scheduled around the theme "United to serve others."

Telephone Pioneers — employes with 21 or more years of service in the industry — now number approximately 197,000 persons and include both active and retired telephone workers.

Frederick R. Kappel, president of AT&T, will be the principal speaker at the banquet which closes the convention on Thursday, Oct. 1. This event will be held in Cleveland's public auditorium.

Headquarters for the convention are being set up in the Statler-Hilton Hotel.

Presiding over this year's assembly will be Pioneer President Henry T. Killingsworth, vice president of the long lines department of AT&T.

General assembly sessions will be held each morning to discuss Pioneering programs and plans. In addition, there are four workshops scheduled: Reports on community service projects —Braille, aid to the deaf, etc.; ways and means of meeting a budget deficit, Pioneer publications, and women's activities.

Group conferences will discuss keeping management informed, commemoration of historical firsts and other events, carrying the safety concept to our neighbors and our communities, and subjects for classes and courses in self-development.

Chapter presidents and secretaries will also meet to discuss Pioneer activities and programs.

Prior to the meetings, the Officers' reception on Monday, Sept. 28, will enable visitors from every state and Canada to get acquainted and to renew old friendships.

A tea and fashion show for the ladies is scheduled for Tuesday, and an evening of theater is planned for Wednesday. Also on the entertainment itinerary is a sight-seeing tour of the city.

The 90-voice Ohio Bell mixed chorus will perform during the banquet on Thursday. Dinner music for the banquet will be provided by Clint Noble's orchestra; later, the same orchestra will play for a dance in the Statler-Hilton ballroom.

General chairman for the 1959 meeting of the general assembly is Carlisle K. Milner, personnel vice president of Ohio Bell. Frederick L. Elder, serving as assistant general chairman, and 11 separate committees with 200 people as members, have been busily planning and working on the activities to insure a successful and memorable Pioneer convention.

General of Cal. Stages Color "Luau" Sales Day Promotion

Employe enthusiasm, hard work and cooperation transformed a typical General Telephone Co. of California office building into an island paradise in Long Beach, recently, with the two-fold purpose of honoring Hawaii and creating the proper spirit for selling color telephones and extensions.

In line with the company's California-wide color "luau" telephone promotion, which started on June 1, Long Beach employes spent weeks of preparation to make the one-day celebration a success.

Props and colorful displays were gathered by company employes, who, on their own, decorated the various offices throughout the telephone building, lending an authentic South Seas atmosphere. Posters were provided by Pan American Airlines, United Airlines and Matson Shipping Lines, and Hawaiian music was transmitted through four speakers. Colorful mobile balances with captions stating the four steps to sales, including "Get the facts," "Make recommendations," "Overcome objections," and "Close sale;" and Hawaiian costumes worn by both men and women employes, added to the overall mood.

To inject a spirit of competition, prizes were offered to those employes with the best costume or those employes who sold the most color telephones and extensions.

As a result, during the day, over 42 telephones were changed to color; 78 extensions, 24 of which were color, were sold; and 21 primary service installations, four of which were color, were applied for.

A hula dance by two General Telephone Co. of California employes, Virginia Sees, left, and Kathy Lansing, set the mood for the start of the color "luau" sales day recently held in the company's Long Beach exchange office. Russell Gray, commercial representative (holding microphone) acted as emcee for this spectacular while co-workers looked on.

Particularly attractive were the service representatives who added artificial Hawaiian leis, colorful blouses, and flowers in their hair. On their desks were promotional cards to carry out the color "luau" theme.

To further enhance this promotion, posters playing up the theme and colorful streamers were displayed in the plant center and poleyard offices.

Plastic pocket protectors advertising the decorative value of color telephones were given to all plant selling personnel and folders titled "Things To Know About Your Telephone," were issued to the plant sales forces for distribution to subscribers receiving color telephones.

Commenting on the results of the color "luau," C. R. Duncan, manager of the Long Beach exchange office, said: "I have never seen employe morale any higher than I did during this celebration. Enthusiasm for selling was significantly reflected by the number of sales that were made . . ."

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21 Attend Executive Course At University of Michigan

The School of Business Administration of the University of Michigan, Ann Arbor, on Sept. 4 concluded its ninth year of summer public utility executive programs. In attendance at this year's first session, June 21 to July 17, were six Independent telephone company men and three from the Bell System; at the second, Aug. 10-Sept. 4, were nine personnel from Independents and three from Bell companies.

W. C. Tuthill, director of the program, states that demand for places in the course became so great in its seventh year, 1957, that two sessions had to be offered. During the program's nine years more than 700 executives from approximately 170 private utility companies located in 42 states, the District of Columbia, and nine foreign companies, have enrolled in the course.

Mr. Tuthill also reports that, each fall, appraisal questionnaires are reviewed by the faculty and a committee from the utility industries as a first step in planning the courses to be offered the following summer. He says that, as a result, substantial changes have been made both in content of courses and in personnel staffing the program.

Those from the telephone industry who attended the first session of the University of Michigan's public utility executive program are:

Roderick D. Andrews (Lincoln Telephone & Telegraph Co.) of Lincoln, Neb.

Lindsay F. Baker (Southwestern States Telephone Co.) of Stuttgart, Ark.

Max A. Brackett (Wisconsin Telephone Co.) of Milwaukee, Wis.

Richard G. Cotton (Michigan Bell Telephone Co.) of Detroit, Mich.

N. L. Hart (General Telephone Co. of California) of Santa Fe Springs, Cal.

Paul F. Hoff (General Telephone Co. of Indiana) of Fort Wayne, Ind.

Frank C. Kennedy (Northwestern Bell Telephone Co.) of Omaha, Neb.

Robert E. Paulsen (Southwestern States Telephone Co.) of Brownwood, Tex.

Frank W. Schlaefer (West Coast Telephone Co.) of Everett, Wash.

Telephone men who attended the second session are:

Mark F. Cooper (General Telephone Co. of the Southwest) of San Angelo, Tex.

Joseph B. Fanning (Wisconsin Telephone Co.) of Milwaukee, Wis.

Gaylord Horton (General Telephone Co. of Wisconsin) of Madison, Wis.

James L. Malone (General Telephone Co. of Illinois) of Bloomington, Ill.

Owen N. Rabourn (California Water & Telephone Co.) of Monrovia, Cal.

John A. Reitze (General Telephone Co. of Kentucky) of Elizabethtown, Ky.

Bruce F. Robinson (General Telephone Co. of Michigan) of Muskegon, Mich.

G. E. Rohe (General Telephone Co. of Nebraska) of Columbus, Neb.

Fred G. Schick (Michigan Bell Telephone Co.) of Detroit.

Raymond Sheehan (General Telephone Co. of the Southeast) of Sumter, S. C.

William A. Tucker (Illinois Bell Telephone Co.) of Chicago.

James Wilkinson (Hawaiian Telephone Co.) of Honolulu, Hawaii.

Management Course in Tex. Covers "Followership"

Effective "followership" is now being taught executives in one-week courses given at the Personnel Psychology Services Center at the University of Houston in Texas.

"An executive may be a good leader, but a lousy subordinate," explains Dr. John F. MacNaughton, director of the center.

Followership is a quality too many executives fail to develop or just simply ignore—to the detriment of their own careers, personnel relations and their companies' objectives, say other members of the staff.

Effective followership, it is explained, does not imply following blindly. It does mean understanding the superior's behavior, learning to take direction from above and, as a result, doing one's share of carrying out one's responsibilities within a group.

Corporate interest in the Houston University classes indicates businessmen do not regard the followership criticism lightly. Among companies that have sent executives to the center are General Motors Corp., Eastman Kodak Co., International Business Machines Corp., Minneapolis-Honeywell Regulator Co., Du Pont Co., Union Carbide Corp., Eli Lilly & Co. and International Paper Co. Altogether 125 different companies in 26 states have sent executives to the week-long institutes since the center opened seven years ago. For $250 apiece, the supervisors sit in for a week in courses on matters ranging from interviewing techniques and personnel testing to the principles of followership.

Doctors Ban Outside Area Yellow Page Listing in Conn.

The question of what is ethical and what is not reared its head recently, *Medical Economics* reports, when a group of Naugatuck Valley (Conn.) general practitioners (GP's) discovered that specialists in adjoining Fairfield County were taking yellow-page listings in the valley telephone books.

The Fairfield County medical society ruled that this is "unethical invasion." It said it would "henceforth be improper" for its members to take listings in an area where they do not have an office, a residence, or a hospital connection.

Telephone Growth Planned By Four Countries

From 1961 to 1966, Bombay (India) Telephones expects to add 100,000 connections to the Bombay system, according to the general manager.

The waiting list for service, as of January, contained 9,500 names. Since then, 3,000 new connections have been added, but the waiting list has increased to 12,000.

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In India's neighboring country of Ceylon, the telecommunications department plans to give the capital city, Colombo, a new telephone system by 1962. Subscribers within a 15-mile radius of the city will be able to dial each other direct on a unit-fee basis.

Initial capacity will be 21,000 lines, which are to be doubled in five to six years. The new installations will replace the present system which covers the Colombo municipal area only. The new system is estimated to cost $9,439,400.

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On the African continent, Tunisia is reported to be planning a change in the telephone system of its capital, Tunis.

The present network with 13,000 automatic telephone lines will be completely replaced by 21,000 crossbar lines, it is reported. Four thousand lines will connect the capital with its suburbs. The exchange will have 100 national and international long distance lines. The cost of this modernization is approximately 2.5 million dollars.

An automatic exchange is also planned for the city of Bizerte.

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In the Western Hemisphere, work is expected to start in the summer of 1960 on telephone communications for Brazil's new capital, Brazilia.

The new city, built about 600 miles from Rio de Janeiro, requires the establishment of a vast network connecting it with the country's major centers.

The local network will cost an estimated 2 million dollars. Thirty terminals for short-wave connections will also be provided.

Outdoor Safety Classes

Rockford, Ill.'s vacationing school children were given special safety classes recently by an Illinois Bell Telephone Co. installer. He visited all of Rockford's parks and playgrounds and, with nearby telephone poles as props, explained safety procedures. He also suggested safety ideas such as keeping kites away from high wires and not climbing poles to free entangled kites. This is the newest phase in Illinois Bell's school program.

Recent Quotations of Independent Telephone Stocks

	8/28/59 BID	8/28/59 ASKED	7/31/59 BID	7/31/59 ASKED
Anglo-Canadian Telephone Co.	36	37	35	36
California Interstate Telephone Co.	15¼	15¾	15	15¼
California Pacific Utilities Co.	34½	35	35	35½
California Water & Telephone Co.	26	26½	26¼	26¾
Carolina Telephone & Telegraph Co.	165 Bid		163 Bid	
Central Telephone Co.	25½	26	26¼	27
Chenango & Unadilla Telephone Corp.	27 Bid		26	27½
Cincinnati & Suburban Bell Telephone Co.	92¾	93¾	91½	92½
Commonwealth Telephone Co.	18¼	19	18¾	19¼
Florida Telephone Corp. Class A	30½	31½	30¼	30¾
General Telephone Corp. Common	72½	Last Sale	75¼	Last Sale
Hawaiian Telephone Co.	22¾	23¾	22¼	22¾
Indiana Telephone Corp.	19½	21	19	21
Inter-County Telephone & Telegraph Co.	57½	59½	57½	59½
Inter-Mountain Telephone Co.	15¾	16¼	15¾	16¼
Lincoln Telephone & Telegraph Co.	60 Bid		60 Bid	
Middle States Telephone Co. of Illinois	22½	23	22½	23½
North Carolina Telephone Co.	1½	1¾	1⅝	1¾
Northern Ohio Telephone Co.	46	48	45	47
Peoples Telephone Co.	88 Bid		90 Bid	
Rochester Telephone Corp.	28¾	Last Sale	27¾	Last Sale
Southern Nevada Telephone Co.	22½	23½	21¼	22¼
Southern New England Telephone Co.	45	45½	47	47½
Southwestern States Telephone Co.	23¾	24¼	24¾	25¼
Telephone Service Co. of Ohio Class A	114	117	120	128
Tidewater Telephone Co.	25	27	25¼	27
United Utilities, Inc.	33¼	34	31¼	31⅝
West Coast Telephone Co.	25⅝	26½	26¼	27
Western Light & Telephone Co., Inc.	42½	43¼	42	42½

(Quotations supplied by Merrill Lynch, Pierce, Fenner & Smith)

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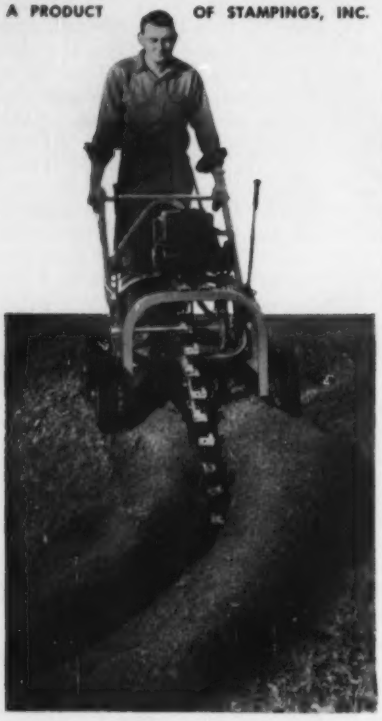

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with the

POW-R-SPADE TRENCHER

Unsolicited performance reports from actual users state that POW-R-SPADE narrow trenches cost only 1 cent to 3 cents per foot, *including labor.* (Many report much less than 1 cent per foot.) Digging speed varies from 1½ ft. to 17 ft. per minute depending on soil conditions. POW-R-SPADE is light, rugged, with minimum of maintenance. Shipped *completely* assembled. Neat, fast, professional trenches—3 in. wide to 24 in. deep, or 4 in. wide to 18 in. deep Send coupon today.

One man can transport from job to job.

Stampings, Inc., 321—24th St., Rock Island, Ill.
Please send literature on POW-R-SPADE:

NAME

COMPANY

STREET

CITY STATE

KING IS DEAD—LONG LIVE THE KING

(Continued from page 23)

worked from dawn to dark with little time out for rest or meals. They never complained. They just worked and performed miracles and eventually turned the damaged leads to normal in record time.

Called for Celebration

Usually the clearing of the last bit of storm trouble called for a celebration. Then the men would play just as hard as they had worked, the foreman joining the fun. Perhaps the gala affair wouldn't have been approved by some individuals, but it was an opportunity for the men to let off steam, and they did just that.

There was only one man who could tame a foreman and his gang. When the job of rebuilding a farm or toll lead called for a camping outfit, the cook took over the reins, at least while the men were in camp. He made the foreman's life miserable and this pleased the crew no end. "Cookie" would entertain no usurpation of his authority, he was boss of the camp and he let everyone know it. He would bawl out the foreman for an infringement of his domain as quickly as he would the newest man in the crew.

Most foremen were as honest as the day is long. They watched over the company's expenses as though the money was being paid out of their own pockets. The average foreman was not a good accountant—figures confused him. He relied entirely upon the clerk's ability to do the bookkeeping. When an error in his accounts appeared, he sweated it out in worried fashion until the mistake was found and corrected. To question his integrity put him in a frame of mind to commit mayhem.

Sensitive to Criticism

He was a little too sensitive to criticism. Not that he thought because he was a foreman, "he could do no wrong." This feeling was probably brought about through the many experiences he had had with inspectors. Many, through ignorance, had been critical of certain decisions the foreman had made. He was familiar with the "spec book" as a professor is with his subject. He knew just where to place a guy wire to relieve strain on a corner pole, and he put to use many innovations gained from experience, which did not appear in the "spec book." When a knotty problem appeared, for which he could find no written answer, he would improvise and generally with good results. When such decisions were questioned by an inspector and later found to be the best solution to the problem, the foreman's estimation of the inspector dropped considerable.

Had Good Judgment

He believed in the construction "bible" implicitly and followed its dictates conscientiously. But, there were many times when common sense and good judgment found the answer to a problem that had bothered the experts for a long time.

But the old foreman has disappeared and with him has gone a tradition. The "floater" is as extinct as the dodo bird. The foreman of today is the same accomplished man as his predecessor. But, he does not have the same job material or tools to work with. The open-wire leads are being replaced with cable and when these go underground the pole line disappears also. I doubt if there are many real old-time foremen alive today. Advancement in tools and circuit design have replaced the ancient pole-hole-digging "grunt." Like the cowboy of the old west and the hardy pioneer, our foreman has taken up the building of new toll leads and exchange facilities in the celestial world . . . "The king is dead . . . Long live the king!"

Kan. Company Standardizes On Light Gray Telephones

When the Reno Telephone Association, Inc., Hutchinson, Kan., cut over its Murdock exchange to automatic operation recently, only light gray telephones were furnished subscribers.

Because of this standardization policy, there was no additional charge for the colored instrument, D. W. Wright, the company manager, stated on Aug. 13.

This may be the first instance of a company installing all color telephones upon cut-over to dial service.

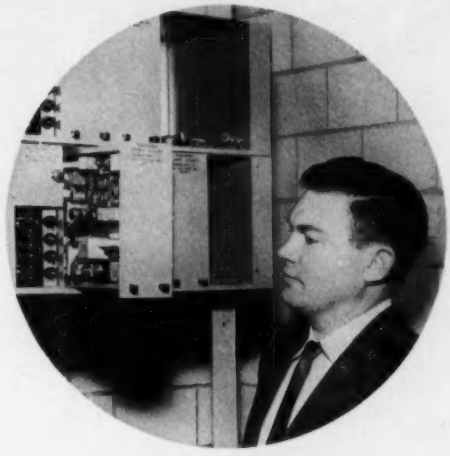
New York City Council OKs New Plan for Public Booths

A plan to encourage the New York Telephone Co. to install 2,000 single and multiple paystation telephones on streets, near parks and in other public areas with an income to the city of $800,000 to 1.6 million dollars has been approved by the New York City Council.

Under the plan, the city would issue licenses permitting booths to be set up in transportation terminals, amusement areas, beaches and shopping centers. While no fee would be charged for the licenses, the city would collect the usual

STUDY

Ronald Carruthers, Commonwealth's chief equipment engineer, looks over four channels of conventional carrier equipment. Kellogg's K-31 Carrier offers more exclusive features than any other brand. Using a single exclusive Kellogg repeater, the K-31 enables you to *double* carrier mileage; two repeaters *triple* mileage.



COMPARE

Note compact construction of four Kellogg K-31 Carrier channels. The K-31 is fully transistorized, features plug-in components, stand-by power as standard equipment—all at less cost than for any other comparable system on the market! K-31 Carrier makes rural subscriber carrier economical and practical for independents.

BE CONVINCED

Prior to the installation of the K-31, Commonwealth operated two subscriber lines carrying a total of 36 subscribers. With four K-31 channels, the line fill is reduced to 6 parties per line. Pictured left is D. Kempf of Kellogg. Equipment was installed under supervision of Jacob Kelley of Commonwealth.

How Kellogg K-31 Carrier Came to Commonwealth Telephone Company

Study . . . compare . . . be convinced! That's the story behind the success of Kellogg's K-31 Carrier.

Commonwealth Telephone Company of Pennsylvania followed these simple steps. Result: another satisfied K-31 Carrier customer, repeating a pattern being set in all parts of the country.

Progressive independents like Commonwealth are taking full advantage of the better subscriber service offered by Kellogg Carrier's advanced electronic equipment.

Why not investigate how Kellogg Carrier can help improve your service? Your local Kellogg representative will be happy to assist you in every way.

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Communications Division of
International Telephone and Telegraph Corporation

commissions paid by the company to subscribers who permit the installation of paystations on their premises.

City Council President Abe Stark said the company last year paid the city $515,152 in commissions from 3,553 paystations in subway stations and in public buildings. The New York Transit Authority received $271,482 and the city treasurer $243,670.

Taylor, GT&E Finance Head; Guest, Controller

Jacob B. Taylor has been elected executive vice president-finance and Leon C. Guest Jr. has been elected vice president and controller of General Telephone & Electronics Corp., it was announced on Aug. 17 by Donald C. Power, chairman and chief executive officer.

Mr. Taylor has been vice president-finance since October, 1957.

Mr. Guest has been controller of Sylvania Electric Products Inc., a subsidiary of GT&E. He will assume his new duties on Sept. 1 and will report to Mr. Taylor.

A native of Perth Amboy, N. J., Mr. Taylor joined General in 1957 from Ohio State University, where he had been vice president and business manager, with responsibility for the university's finances and investments. He formerly had served as professor of accounting and chairman of the accounting department at Ohio State and was on the faculty of the University of North Dakota.

J. B. TAYLOR

Mr. Taylor is a past president of the American Accounting Association, and the Central Association of College and University business officers.

Mr. Guest is a native of Riverton, N. J. He joined Sylvania as an auditor in 1943, and subsequently became manager of the internal auditing department.

He became a division controller in 1949, assistant controller of the company in 1953, and shortly thereafter was elected controller.

He is a member of the Controllers Institute of America, and vice presi-

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dent and trustee of the Controllership Foundation, the research arm of the Controllers Institute.

Paystations Tied to N. Y. Motel Promotion Plan

A public telephone will be located next to a signboard listing motels and other overnight accommodations at three New York superhighway exits.

The New York Thruway Authority is in charge of the project which is a departure from its ruling banning billboards within 500 feet of the superhighway.

The move is experimental, a spokesman said. The signs are to be erected at Albany, Catskill, and Fultonville. A map will be posted on each board.

The signs will be set up outside the toll booths near small parking areas.

National Safety Congress Sets Four Utility Sessions

Four sessions of the 47th National Safety Congress, annual convention of the National Safety Council, will be devoted to problems of the public utilities industry. These will be held on Oct. 21 and 22 at the Conrad Hilton Hotel.

Topics to be discussed will include "Is Your Grounding a Hazard?" and "Modernizing Line Construction and Maintenance."

A safety workshop will deal with distribution and transmission safety problems and their solutions.

Other items of interest to delegates will be a discussion on supervisory training — "Simpatico and Safety" — and a motion picture on mouth-to-mouth resuscitation.

The National Safety Congress will be held Oct. 19-23 in Chicago, and will attract an expected 12,500 safety men from the United States, Canada and several foreign countries.

Book Reviews

"TRANSISTOR CIRCUIT HANDBOOK," by Lewis E. Garner, Jr.; 410 pages; $4.95.

Although this book is published by the Coyne Electrical School, it is not intended to be a text book. Rather, it is a reference work on the practical uses of transistors.

It consists of four parts. The first three are laboratory practice, basic circuits, and circuit applications. The fourth part covers general reference material.

The part relating to laboratory practice is not as ponderous as it may sound. It consists of an explanation of

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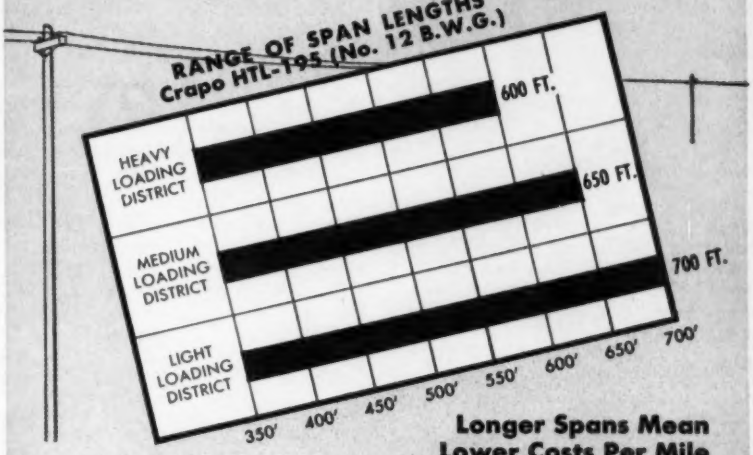

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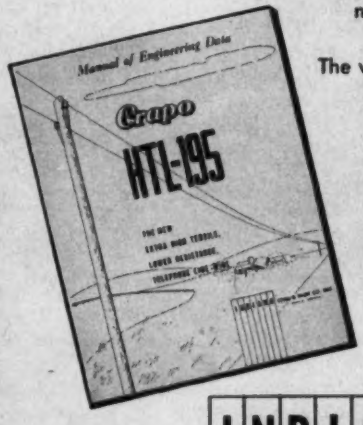

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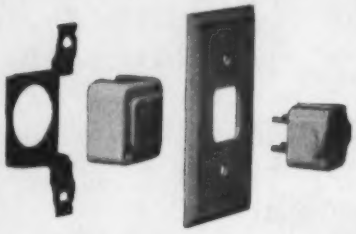

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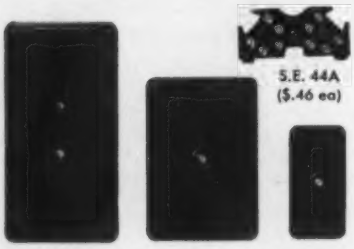

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transistor theory, and of the different types of junctions and how they are made. This part also gives the basic electrical requirements for the transistors. Techniques for handling and wiring the units are also presented.

The basic circuit section gives numerous diagrams for different types of amplifiers, controls, and coupling methods, with a separate chapter for different types of oscillators.

The application division shows how these basic building blocks are put together to make a practical working circuit. This is a sort of do-it-yourself section which contains the lists of parts necessary to build the devices shown.

The last part of the book contains a section on test instruments. This book is available through TELEPHONY.

•

"INDUSTRIAL ELECTRONICS CIRCUITS," by R. Kretzmann; 194 pages, illustrated; $10.00.

This book was translated from German into English and is part of the Phillips Technical Library. It might be regarded as a companion volume or a sequel to the "Industrial Electronics Handbook" which was reviewed in the Apr. 12, 1958 issue of TELEPHONY. This is a volume of practical workable circuits, with little space wasted on theory.

Practical electronics men like this kind of a book because if a circuit is needed for some application, it is a lot easier to start with a working one and modify it, than it is to design a new one from the ground up.

Furthermore, working technicians usually find it simpler to understand a circuit diagram than they do a lot of words about theory. A telephone man could use this book to learn about nearly a hundred photoelectric, counting, stabilizing, pulsing, control, oscillator, amplifier, and rectifier circuits by merely studying the diagrams given.

Each circuit shows all the values for resistors and capacitors, so the reader could actually build the apparatus shown if required. The tube types illustrated bear European numbering, but equivalents can usually be obtained in the United States. This book can be ordered through TELEPHONY.

•

"AN INTRODUCTION TO THE THEORY OF RANDOM SIGNALS AND NOISE," by Davenport and Root; 389 pages; $10.00.

The Lincoln Laboratory of the Massachusetts Institute of Technology is known to telephone men as one of the places where the SAGE system has been developed.

Telephone men also know that the transmission of SAGE and other data signals has uncovered a host of problems involving noise, which never mattered on regular telephone circuits.

Data transmission circuits have had to be of such a design that a certain amount of noise could be tolerated. It perhaps was to be expected that the Lincoln laboratory would publish a book as an outgrowth of this work and this volume apparently is it. Indeed, it is the first of a new series of books to be known as the Lincoln Laboratory Publications.

The book approaches the problem with a view towards introducing the reader to the statistical theory underlying a study of signals and noises in communications systems.

It contains an introduction to probability theory and the effect of random signals in different types of systems.

This book is top level engineering and requires a knowledge of electrical network theory and an advanced engineering calculus course containing Fourier series and integrals.

Actually it is designed as the basis for a one or two semester first-year graduate course. About half of the book is devoted to the development of probability theory of statistics and the remainder is devoted to applications. Although only the skilled transmission engineer will understand this volume, it is from his province that the data transmission telephone circuits of the future must come. This book will be welcome by those in this field and can be purchased from TELEPHONY.

Reviews by Harold B. McKay, TELEPHONY's Electronics Editor.

Canadian Pay-As-You-See TV Contract Signed

Pay-as-you-see TV came closer to realization in the Toronto, Canada area with the signing of a contract between the Bell Telephone Co., of Canada and the Famous Players Canadian Corp.

The telephone company in coming months will install 84 miles of cable in the Toronto suburban area of Etobicoke, to carry the new type of commercial-free television.

The new cable system, partly underground and partly on poles, will follow regular telephone routes and be able to serve 13,000 Etobicoke households. It is reported the service can be expanded to serve 40,000 households in western metropolitan Toronto.

G. B. Offers Credit Service

Every British telephone subscriber, beginning early in 1960, will have a telephone credit card with a special number which he can quote when making paystation calls. Called "on tick" service, it will cover both domestic and

overseas calls. A small charge will be made for this service, but the price of the call will remain the same. The charge will be billed on the subscriber's account. This is part of the British Post Office's program to get more people interested in telephone service.

AMPLITUDE MODULATION

Concluded from page 20

bands will exist at R_L. The instantaneous current through R_L will be approximately the product of the instantaneous modulating voltage at E_v and the first term of the equation for the instantaneous transfer conductance.

Thus for a single-frequency modulating signal, and neglecting all terms except the first,

$$i_L = e_v g_t = (E'_v \sin\omega_v t)\left(\frac{4G_T}{\pi}\sin\omega_c t\right) =$$

$$\frac{4G_T E'_v}{\pi}(\sin\omega_v t \sin\omega_c t).$$

The substitution E'_v for E_v was made because E'_v is the maximum value; the substitution $\Theta = \omega_c t$ was made because Θ is varying at the carrier rate, and $\Theta_c = \omega_c t$.

From trigonometry, $\sin\omega_v t \sin\omega_c t = \frac{1}{2}\cos(\omega_c - \omega_v)t - \frac{1}{2}\cos(\omega_c + \omega_v)t$. Also, the output voltage across R_L will be $e_L = i_L R_L$.

Hence,

$$e'_L = \frac{2G_T E'_v R_L}{\pi}\cos(\omega_c - \omega_v)t -$$

$$\frac{2G_T E'_v R_L}{\pi}\cos(\omega_c + \omega_v)t.$$

This shows that a lower sideband of frequency $f_c - f_v$ and an upper sideband $f_c + f_v$ exist at R_L since $\omega_c = 2\pi f_c$ and $\omega_v = 2\pi f_v$.

These are the two sidebands created by the modulation process and these sidebands each contain all the information of the message to be transmitted at frequencies above the original voice frequency.

For simplicity, the modulating signal E_v was assumed to be sine wave of frequency f_v; in practice it would be a complex speech wave within the band 200 to 4,000 cycles.

Experimental verification

The circuit of *Fig. 2* was connected to verify experimentally the preceding equations. Parts were selected at random from stock. No attempt was made to match crystal diodes; they merely were checked with an ohmmeter to ensure that they were not defective.

The open-circuit carrier voltage E_c was set at 8.0 volts rms; the frequency f_c was 3,500 cycles. The internal impedance R_c of the carrier source was 600 ohms resistance. The open-circuit voice-frequency modulating voltage E_v was set at an effective, or rms, value of 1.0 volt; the frequency f_v was 500 cycles. The internal impedance R_v of the voice-frequency source was 600 ohms resistance. The load resistance was 600 ohms.

From the equation of the preceding paragraph, there should be a lower sideband (side frequency, to be exact) at 3,000 cycles, and the magnitude of the effective, or rms value should be $\frac{2G_T E_v RL}{\pi}$ volts; a sideband of the same frequency should exist at 4,000 cycles.

From the equations previously given, the transfer conductance is $G_T = 600/(600 \times 600 + 600 \times 600 + 600 \times 600) = 0.00055$ mho.

Then, the magnitude of each sideband will be $2 \times 0.00055 \times 1.0 \times 600/3.14 = 0.21$ volt.

A wave analyzer was used to measure the magnitude of the sideband voltage at 3,000 cycles and at 4,000 cycles, and the voltage at each frequency was found to be 0.2 volt.

Attention again is called to the fact that a large carrier component but negligible audio component will exist in the output. An examination of *Fig. 2* will show that the carrier source feeds into a path of R_c in series with the parallel combination of R_v and R_L.

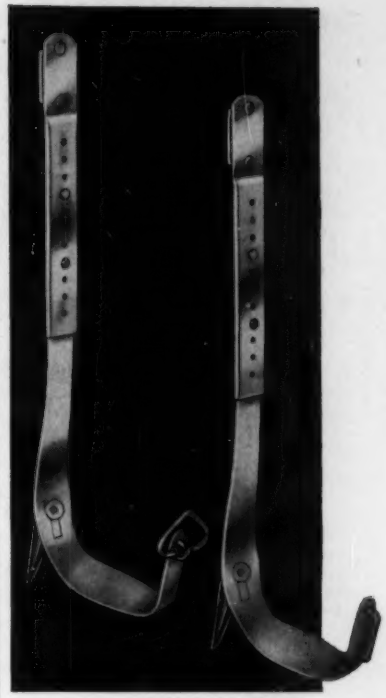
Hence, the equivalent resistance is $600 + 300 = 900$ ohms, the current supplied by the carrier source is $8/900 = 0.0089$ amperes, and the voltage across R_L (and R_v in parallel) will be $0.0089 \times 300 = 2.67$ volts. Measurements with the wave analyzer gave 2.75 volts.

In the next, and concluding, article a method of modulation will be considered that eliminates the carrier component but passes the voice component, and another method will be discussed that eliminates both the carrier and the voice components and supplies only the sidebands to the output. Also, demodulation will be treated.

(To Be Continued)

Bell Elects K. G. McKay

Kenneth G. McKay has been elected vice president in charge of systems engineering of Bell Telephone Laboratories, effective Sept. 1. A research physicist, Dr. McKay has been associated with electronic, semiconductor and solid state research and development programs at Bell laboratories since 1946.



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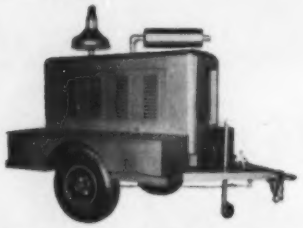

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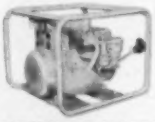

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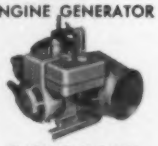

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New Building Enclosure Used for Merchandising

Mountain States Telephone & Telegraph Co., Denver, contributed an unusual note of humor in the "Rush to the Rockies" Centennial during June. The site was the power line enclosure around the new annex building, currently under construction, to Mountain States headquarters building. Here, instead of building the usual plain board fence, Mountain States made an arrangement with the contractor whereby the enclosing fence became a huge "billboard" honoring the centennial.

Surrounded with cartoon figures of wigwams, pine trees, mounted braves in full headdress, etc., a sign lettered in 1859 script read:

"Tomtoms to telephones. Once an Indian campground, later a pony express corral, this site will house administrative offices to serve Colorado's 700,000 telephones.

"Mountain States Telephone—Growing with Denver for over 80 of her 100 years."

Extending over 250 feet around a corner, the enclosure wall became a giant cartoon strip.

Extending down the left side of the building were pioneer figures and a sign suggesting, "Watch For Our Centennial Telephone Window Displays On The Corner—Coming Soon!". The scene here showed a pioneer Daniel Boone figure watching while telephone work crews laid ground cable with familiar "Men Working" signs. Subsequent cartoons showed a miner in his tent, the entrance to a Gold Rush saloon, a card-shark gambler with an ace of diamonds spilling out of his coat sleeve, a hotel, mining cabins, and a prospector attempting to start a balky burro. At the end of the fence another sign pointed out:

"A Centennial Milestone For Denver. — Direct Distance Dialing From Your Telephone to Cities Throughout the Nation. Coming Early in 1960."

The cartoon figures were developed by Mountain States' display department.

ABC OF THE TELEPHONE

Continued from page 26

center two pins on a 10-pin crossarm.

4-pin crossarm:

1-2, 3-4.

6-pin crossarm:

3-4, 5-6, 7-8.

Again, this can be related to the center pair and the two adjacent pairs of a 10-pin crossarm.

8-pin crossarm:

1-2, 3-4, 7-8, 9-10.

This is similar to a 10-pin arm with the center pins omitted.

The numbering for a second 8-pin crossarm on the same pole would be: 11-12, 13-14, 17-18, 19-20.

10-pin crossarm:

First arm: 1-2, 3-4, 5-6, 7-8, 9-10.

Second arm: 11-12, 13-14, 15-16, 17-18, 19-20.

16-pin crossarm:

First arm: 1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14, 15-16.

Second arm: 21-22, 23-24, 25-26, 27-28, 29-30, 31-32, 33-34, 35-36.

Third arm: 41-42, 43-44, 45-46, 47-48, 49-50, 51-52, 53-54, 55-56.

As previously mentioned, crossarms for joint use lines generally have additional space provided at the center of the arm. Similar climbing space may be provided by not using the center or pole pins of a non-joint use crossarm. The numbering of typical crossarms in this instance would be as follows:

6-pin crossarm:

1-2, 3-4.

4-pin crossarm:

1-2.

10-pin crossarm (pole pins not used):

First arm: 1-2, 3-4, 7-8, 9-10.

Second arm: 11-12, 13-14, 17-18, 19-20.

16-pin crossarm (pole pins not used):

First arm: 1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14.

Second arm: 19-20, 21-22, 23-24, 25-26, 27-28, 29-30, 31-32.

Wooden Pole Brackets

Wooden pole brackets can be used on an open wire line when a maximum of one or two lines is all that may be required. A pole bracket is, for all practical purposes, an insulator pin designed for installation on the side of a pole. Pole brackets usually cost less than a crossarm even if one set of brackets is installed initially and a second set is installed at some later date.

Brackets for the wires of a pair may be installed on the same side of a pole, as illustrated in *Fig. 6A*, or on opposite sides of a pole, as shown in *Fig. 6B*. If two pair of wires are installed, the brackets for each pair are generally placed on opposite sides of the pole with staggered spacing, as in *Fig. 6C*. If mid-span clearance cannot be provided by staggered spacing both pairs of brackets are placed at the same height as shown in *Fig. 6D*.

Occasionally four brackets may be placed on one side of a pole. Pole

(Please turn to page 52)

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brackets can also be placed under an existing crossarm when a single extra pair may be all that is required. In this instance, the top bracket is placed to provide 24 inches of clearance, the same clearance usually specified for a second crossarm.

Pole brackets are usually nailed to a pole. Galvanized lag screws or galvanized wood screws can be used if the additional strength is considered desirable. For extra long span construction the greater holding power of the screw-type fastener would be advantageous.

Some bracket installations include a steel reinforcing band placed around the pole and bracket. This would appear helpful in the maintenance of certain lines in the heavy loading area. However, for normal installation procedures, screw-type fasteners would be less costly. In this respect, screws no doubt have the greater holding power; still, nails are most generally used with pole brackets.

Numbering of Wooden Pole Brackets

Wooden pole brackets on exchange open wire lines are generally numbered as follows:

First pair: 1-2.

Second pair: 3-4.

If the circuits are part of a toll phantom group, the brackets are usually numbered as follows:

First pair: 5-6.
Second pair: 15-16.

(To Be Continued)

IN THE NATION'S CAPITAL

Continued from page 18

to be good for *other* industry—including public utilities—including telephone companies, which are already economically regulated by laws as to their rates to the consuming public.

One thinks immediately of the obvious answer—controls. But we have experienced general price controls and at least a semblance of general wage controls during our war emergencies. Nobody wants any more of that on a full industrial scale, hobbling the whole national economy. The voters said to that in 1952, "We've had enough."

But there is another answer and a dangerous one for the steel owners and workers alike—*special controls.* This would mean putting the steel industry in the category of a public utility, or something very much like it. It could be special legislation, imposing some form of public regulation on steel prices and maybe some form of regulation on steel wages, although that would probably not be done as a first step.

It might well be that price regulation of steel would follow the same pattern of rate regulation of conventional public utilities, including telephone. That is to say, wage levels would become more stabilized, more subject to the political resistance against price or rate increases. But this would not happen before steel *profits* had become squeezed, and well squeezed, in the familiar rate of return strait jacket. No more of that 16 per cent stuff. Public utilities are lucky to get 7 per cent.

So, the steel owners first and the steelworkers second (but not very far apart) have a vital and selfish interest in settling their differences voluntarily, while they are still both able to operate in the arena of free, unregulated private enterprise. Objections would, of course, be raised to any such proposed special legislation for the steel industry. They would be long and loud objections: "It's unconstitutional; it's unfair." So what?

Although economic distinctions are easy to make and legal objectives easy to argue, the same thing *could* happen to steel as happened to the railroads, to the gas, electric and telephone companies around the turn of the century, and since then to banking, insurance, holding companies, and security exchanges. If the public gets mad enough, preachments of economists and lawyers will not stop reform laws very long. Let's hope it doesn't happen, because it is so unnecessary. All the parties have to do is face the facts and get back to work.

For the public utilities, already under the yoke of economic regulation, (at least at the price-fixing end) there is a special stake in this struggle to get the great steel industry back on the track of production, without either triggering another inflationary spiral or shackling a major segment of free industrial enterprise with government intervention.

Inflation, in the long run, is the greatest peril and the biggest problem of regulated utility operations today. That includes telephone companies. It lies at the bottom of every rate case. It stalks the corridors of every wage dispute. It prods every stubborn service complaint. It obstructs or hinders every necessary major plant expansion to fill the public service demand.

So, for the telephone companies, as well as for all other utility industries, there is good reason for them to pull for an early and voluntary end to the steel strike. The utility companies, all

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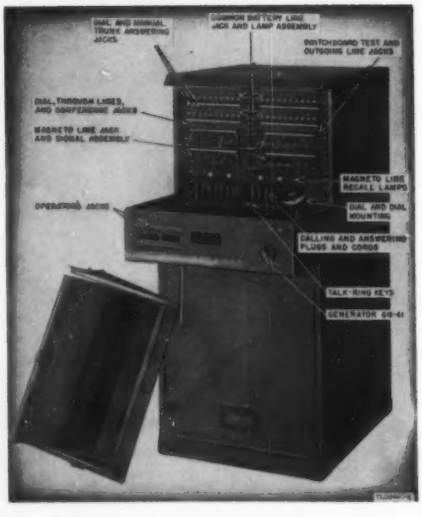
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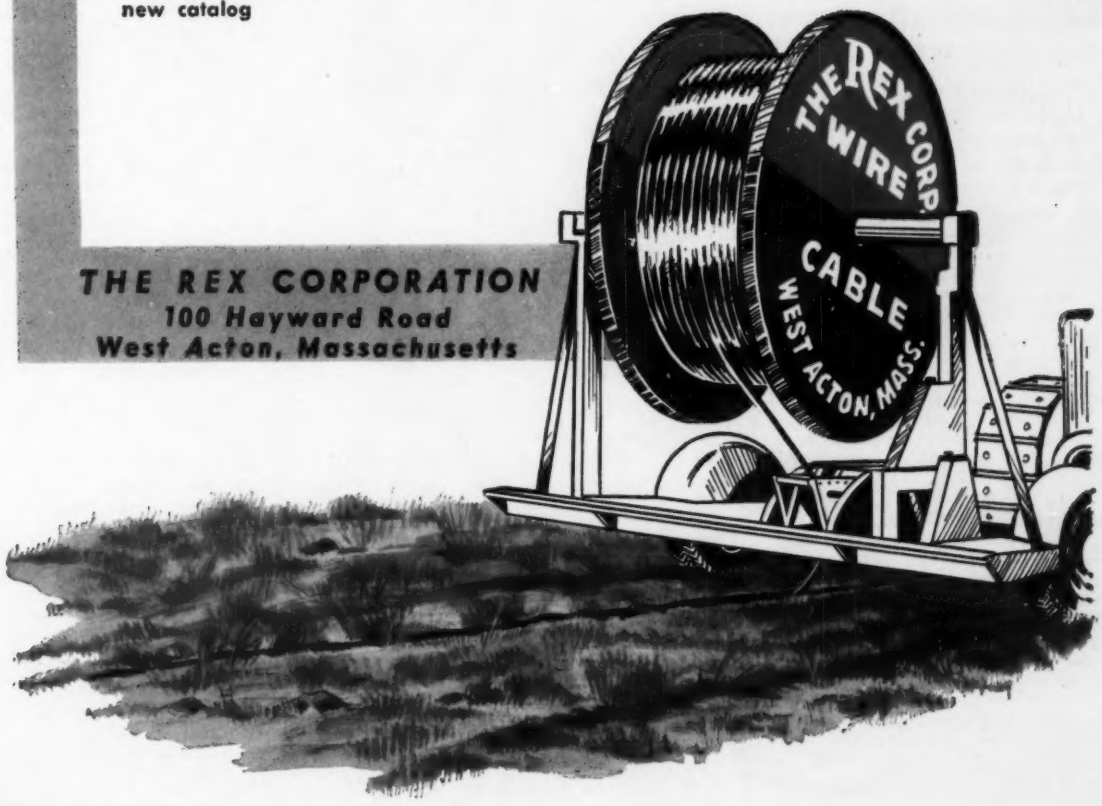

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of them, can well afford to say to the steel owners and to the steelworkers: "Settle it between yourselves, boys, *out there!* We don't need you in our club, and you wouldn't like it here, anyhow."

The Telephone Labor Outlook

As the month of August drew to a close, Congress was still wrangling over labor union reform legislation. Consensus was that a fairly stiff bill would get to the President for his signature notwithstanding the opposition of labor Congressmen.

But up in Unity House, Pennsylvania, where the AFL-CIO leadership had gathered for an executive session, there was no sign of reversing labor's policy of opposition to such reform bills. Every time the labor leaders got together, they were still mulling over the upset vote of the House of Representatives by which the stiff Landrum-Griffin reform bill had passed by a large margin. Surprisingly, the labor leaders blamed it, not on a popular uprising of sentiment for labor reform, but on their own defects in strategy or tactics.

They felt they had not lobbied hard enough nor put on enough pressure. Their answer is, not to ease off, but rather to increase political activity, even if such legislation becomes law. The situation recalls the aftermath of the Taft-Hartley Law when the labor leaders called it a "slave labor act" and vowed to get it repealed. And they have been working hard to get it repealed year after year, but without success. Already one union leader has stirred up a hornet's nest in Congress by writing a threatening letter to every member who voted for the Landrum-Griffin bill. The letter promises labor revenge at the polls.

One of the provisions of the new bill is supposed to cut down on organizational picketing. This is the type of picket line which a union throws up when it is trying to enlist membership in a shop where it has failed to gain recognition.

The more euphemistic name for this is "educational picketing." But it can be abused in some cases, such as those in which the employes of the shop have voted to join another union or prefer to join no union, or where the picketing union has just lost an election and continues its picket line to start another chapter of agitation. As the McClellan committee in the Senate has shown, gangster-operated unions can use such picketing to blackmail employers and employes alike into signing "protection" or "sweetheart" contracts to line the pocket of the gangsters.

Picketing has been an important phase of union organization in the telephone industry. If its use is going to be restricted in the future, the impact on the telephone industry, both labor and management, may be substantial.

But there are other economic forces at work in the telephone business which are giving telephone labor leaders cause for concern. In the summer edition of the Industrial Union Department *Digest*, published by the AFL-CIO, there is an interesting article by Joseph A. Beirne, president of the Communications Workers of America.

Beirne seems to be worried mainly over developments in automation, resulting in pronounced shifts in the numerical strength of the telephone work force from traffic to clerical and plant, and to more or less professional jobs. If this trend continues, as it probably will, it will present quite an organizing problem for the Communications Workers of America, which so far has appealed mainly to traffic employes of the industry.

Beirne's article, which bears the title "The Job Revolution in Telephones," points out that the percentage of traffic employes has dropped from 50 per cent to 34 per cent of all telephone industry employes during the last dozen years. During that same period, the clerical force has gone from 16 per cent to 21 per cent. The number of plant employes has jumped from 17 per cent to 27 per cent, while the professional or partly professional groups have risen from 4.3 per cent to 6.5 per cent. Mr. Beirne says of this:

"New methods must be developed to organize the clerical, professional, and semi-professional workers who historically have not been good union joiners and, secondly, we must determine how we can represent them effectively."

With the steady changing of balance from traffic to plant and clerical, the problem of strike enforcement where a strike is decided upon, becomes a real one for the telephone union. With proportionately fewer traffic employes to go on strike, and with more automatic equipment to keep going during strikes without constant human operation, strikes in the telephone business tend to become less effective. Beirne concedes this in the following passage:

"The use of a union's economic weapon —the strike—needs to be re-evaluated. . . . When fewer and fewer people are actually engaged in providing the direct service to the customer and more and more are involved in auxiliary functions, how effectively can you halt production?

"This coupled with 95 per cent local dial service and 80 per cent long-distance call dialing, suggests a pretty serious situation collective bargaining-wise."

This shifting trend must also be considered in the light of the diminishing appeal of unionization, as such, to a rising proportion of higher-paid supervisory employes. These are the ones who have elected to make their career in the business and become part of the management team. Beirne says there has been an "overall shift to higher paying jobs."

What the outcome of these trends will be in terms of future telephone union organization is obviously high on the worry list of the telephone union chief.

Neb. Depot Cuts Over First Naval Automatic PABX

The U. S. Naval Ammunition Depot at Hastings, Neb. has made the first conversion of an attended PABX to unattended service of any Naval installation in the United States.

Telephones anywhere in the 48,750 acres served through a main 400 line PABX and an auxiliary 100 line PABX by the Lincoln Telephone & Telegraph Co. can now be dialed directly from any subscriber's telephone in the Hastings exchange.

Engineering for the conversion was provided jointly by the District Public Works Officer, Ninth Naval District, and the Lincoln Telephone & Telegraph Co. Cut-over to this improved service was made on July 1.

IMPACT OF THE TELEPHONE

Continued from page 34

The personal income in 1957 was 3,385 million dollars.

The pattern of employment for 1958 is shown below:

Type of Employment	*Percentage Distribution*
Total employment	100.0
Mining	0.2
Contract construction	4.6
Manufacturing	28.5
Transportation and other public utilities	10.1
Trade	23.8
Finance, insurance and real estate	3.8
Service and misc.	11.8
Government	17.2

Nevada

The per capita income has been ahead of both the region and the nation. In 1956 it was 2,413 dollars and in 1939, 841 dollars, which represented an increase of 186.9 per cent.

In millions, the population in 1956 was 0.2, and 0.1 in 1939, an increase of 104.5 per cent. Households in 1956 were under 0.1, but 129.4 per cent higher than in 1939.

Telephones, also in millions, were less than 0.1 in 1956, when 41.5 per cent were taken up by business, against 41.9

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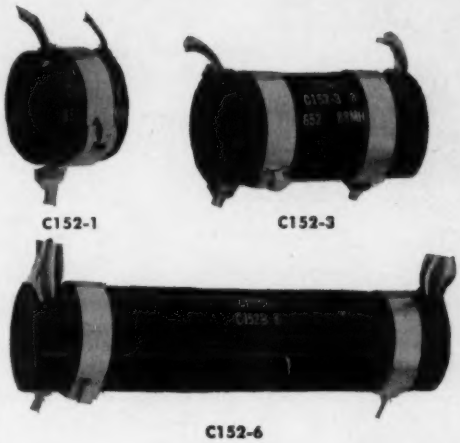

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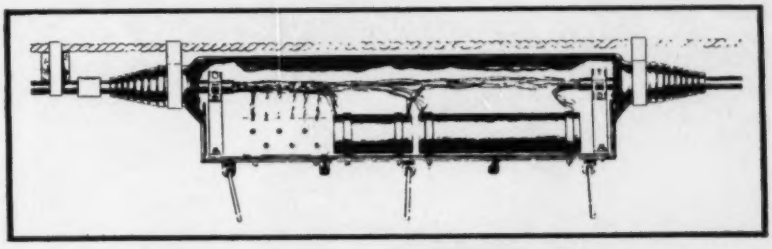

TYPE C152 CASES MOUNTED IN PLASTIC CABLE SPLICE-TERMINAL CASES

C152D LOADING COIL CASE TYPE	CONTAINS COILS TYPE C651 OR C652	APPROXIMATE CASE SIZES DIAMETER	LENGTH	MAXIMUM WEIGHT
C152A	1 to 3 Coils	1½"	Up to 3"	½ Lb.
C152B	4 to 9 Coils	1½"	Up to 6¼"	1½ Lbs.
C152C	10 to 18 Coils	1½"	Up to 13"	3 Lbs.
	19 to 28 Coils	2"	Up to 18"	6 Lbs.

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in 1939. The increase in total telephones was 325.7 per cent.

In thousands, there were 0.1 manufacturing plants in 1939, and about the same number in 1900; employment was 5.0 in 1956; 1.4 in 1939; and 0.5 in 1900.

In millions of dollars, payrolls ran as follows: 1956, 24.0; 1939, 2.3; and 1900, 0.3. Value added by manufacturing was as follows: 102.0 in 1956; 11.4 in 1939; and 0.5 in 1900.

In 1958 total telephones were 93.8, with 39.1 for business and 54.7 for home use.

In 1957 personal income was 647 million dollars.

In 1958 employment distribution was as follows:

Type of Employment	*Percentage Distribution*
Total employment	100.0
Mining	4.8
Contract construction	8.5
Manufacturing	6.2
Transportation and other public utilities	10.4
Trade	21.5
Finance, insurance and real estate	2.9
Service and misc.	27.8
Government	17.9

California

The per capita income of 2,419 dollars in 1956 was the highest in the region; and in 1939 it was 775 dollars, an increase of 212.1 per cent.

Population in millions was 13.0 in 1956, and 6.9 in 1939, an increase of 88.6 per cent. (Percentage is based on full amounts instead of rounded off amounts.) Households in 1956 came to 4.1 million, and 2.1 in 1939, an increase of 95.4 per cent.

In millions, telephones numbered 6.0 in 1956 and 1.7 in 1939, an increase of 248.8 per cent. Business absorbed 31.2 per cent of the telephones in 1956 and 37.6 in 1939.

In thousands, there were 11.5 manufacturing establishments in 1939 and 4.9 in 1900; employment was as follows: 1,195.0 in 1956; 357.0 in 1939; and 84.1 in 1900.

In millions of dollars, payrolls were 6,020.0 in 1956; 553.7 in 1939; and 47.3 in 1900. Value added by manufacturing: in 1956, 10,755.0; 1939, 1,122.5; 1900, 92.4.

In thousands, there were 6,451.6 telephones, with 1,984.0 for business and 4,467.6 for home use in 1958.

In 1957 the personal income was 35,131 million dollars.

In 1958 employment was:

Type of Industry	*Percentage Distribution*
Total employment	100.0
Mining	0.8
Contract construction	6.2
Manufacturing	27.8
Transportation and other public utilities	8.2
Trade	24.1
Finance, insurance and real estate	2.9
Service and misc.	13.3
Government	16.7

(To Be Continued)

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Hubbard Doubles Capacity Of Cicero, Ill., Plant

John R. Morrill, Hubbard & Co. president, has announced the completion of Hubbard's extensive Cicero, Ill., plant addition which was begun less than a year ago.

The new addition doubles the Cicero plant capacity. Production out of the new facilities is already vastly increased and is expected to climb to full capacity by late fall. The plant is devoted exclusively to pole line hardware.

The original sections of Hubbard's Cicero plant have been modernized, also. New and improved lighting has been installed and new material flow has been effected. Construction of new general and engineering offices is virtually completed.

Employment at the plant is being doubled on a two-shift basis. New equipment has been installed, including a 300-ton blanking and forming press,

a 200-ton blanking press, cut threaders and bar shears.

The new plant area includes facilities for banking, shearing, upsetting, forging, trimming, pointing, cut threading, roll threading and cold heading, as well as a new tool room, maintenance shop, locker rooms and a cafeteria.

Snyder, Millner Named to Collins Microwave Posts

The appointment of two microwave sales representatives was announced on Aug. 26 by the Texas division of the Collins Radio Co.

D. F. SNYDER

R. M. MILLNER

Donald F. Snyder will serve the Rocky Mountain states with offices in Denver and Robert M. Millner will serve the North Central states. His headquarters will be in Minneapolis.

Snyder, former sales manager of North Electric Co., is a native of West Point, O. Millner was a regional sales manager for the same firm before joining Collins. He is a native of Minnesota.

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The Lindsay Telephone Supply Co.
Cleveland, Ohio

Pankey Supply Co.
Charlottesville, Va.

Leich Announces Changes in Switchboard Sales Division

D. C. Gibson, president of Leich Sales, announced the following changes in Leich's switchboard sales division, effective Aug. 1.

Paul P. Barnes has been promoted to the position of sales promotion director; Robert W. Weed has been made switchboard department manager, and Arthur A. Schneider is switchboard sales manager.

P. P. BARNES

These changes, according to Mr. Gibson, have been necessitated by Leich's growth in the dial switchboard business and will enable the company to give better service to their customers.

As sales promotion director, Mr. Barnes will be concerned with the commercial aspects of switchboard engineering and related products. He will be responsible for providing technical information and will work in liaison with sales personnel in the release of information on all switching equipment and apparatus.

Mr. Barnes is a veteran in the telephone field, and prior to this new appointment, was switchboard sales manager, which job he has held since 1953.

He started with Leich Electric Co. in 1941 as an equipment engineer. Previous to that, Barnes was in the equipment installation department of Western Electric Co. in the East.

Mr. Weed, in his new job as switchboard department manager, will have charge of all inside work in the switchboard department. His responsibilities will include scheduling of equipment, application of sales prices, cost records, and similar functions.

He joined Leich Electric Co. in 1951 and after various positions in installation, production, and equipment engineering, was transferred to Leich Sales in 1953 as staff sales engineer.

R. W. WEED

He became price and cost coordinator on switching equipment and at the time of his appointment, was assistant switchboard sales manager. He had four years of experience in the telephone field before going to the Leich organization.

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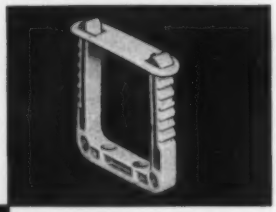

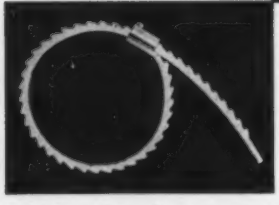

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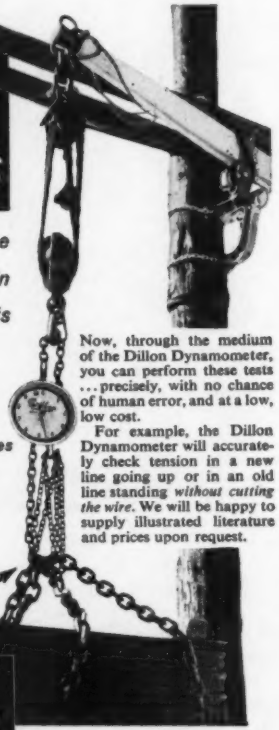

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Mr. Schneider, in his position as switchboard sales manager, will work on a national scale in contacting customers. He will be in charge of training for all sales personnel in the techniques of switching equipment.

A. A. SCHNEIDER

He has been a salesman for Leich in the state of Iowa since 1952.

Before going to Leich, Mr. Schneider was with the Middle States Telephone Co. at Des Plaines, Ill., and previous to that, was in the employ of Western Electric Co.

Name Clark to Stromberg Carrier-Microwave Sales

Harold W. Clark has been appointed assistant chief sales engineer in charge of carrier/microwave, in addition to his duties as carrier/microwave product manager for the Stromberg-Carlson Telecommunication Division, according to T. C. Thompson, general sales manager. (Stromberg-Carlson is a division of General Dynamics Corporation.)

H. W. CLARK

Under the supervision of R. E. Hoffman, chief sales engineer, Mr. Clark has combined the carrier/microwave sales engineering group with the systems engineering group to provide more efficient handling of customer orders.

Mr. Clark went to Stromberg-Carlson from England in January, 1957. He had a broad telecommunication engineering experience, including special emphasis on carrier equipment and its application.

His first assignment at Stromberg Carlson was with the systems engineering group. He soon moved up to group head in systems, and was staff engineer in systems planning prior to his appointment last year as product manager.

Born in London, England, he received his basic engineering education at Dartford College and continued studies in communication engineering at the London Technical Institute and

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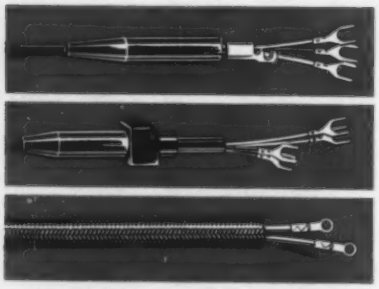

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the Borough Polytechnic. Mr. Clark is the holder of several certificates and diplomas in radio communication and line transmission. He is a member of the American I.E.E. and the I.E.E. (London).

Upon completing his formal education Mr. Clark joined the long distance department of the British Post Office and served in various capacities before deciding to specialize in carrier.

From 1945 to 1948, he served as a lieutenant commanding a special equipment section of the Royal Signals, Middle East Land Forces.

He returned to the British Post Office and was closely associated with the postwar re-equipping of the London Carrier Terminal and the concurrent conversion of the main routes from 12 to 24-channel carrier.

In 1950 he accepted a post with British Telecommunication Research, Ltd., and engaged in a number of new carrier and coaxial equipment developments before being appointed section head of the engineering co-ordination group.

Mr. Clark is also the holder of six patents in the carrier field of telecommunications.

Amchem Appoints Chisholm Agricultural Sales Head

Amchem Products, Inc., Ambler, Pa., manufacturers of "Weedone" and other agricultural chemicals, has announced

D. W. CHISHOLM

the promotion of Dan W. Chisholm from southern district sales supervisor to manager of farm chemicals sales. This appointment brings to three the total number of sales setups in Amchem's agricultural chemicals division.

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For the past two and one-half years, Jack P. Taylor has headed up sales of agricultural industrial chemicals, while Joseph H. Torchiana has been in charge of lawn and garden (small package) sales since September, 1958. All three men report directly to M. B. Turner, general sales manager of the agricultural chemicals division.

Mr. Chisholm joined Amchem as a salesman in April, 1952.

A native Texan, he holds a B.S. in Agronomy from Texas Tech and a Master's degree in the same subject from South Dakota State College.

He was in the Air Force from 1940 to '46 and served as a flight instructor for Chinese, Peruvian, Turkish, and Philippine, as well as American cadets in both bomber and single engine planes.

He will make his headquarters at Amchem's home offices in Ambler.

T. L. Mahoney Named Sales Manager of Warren Company

Timothy L. Mahoney has recently been appointed sales manager of the Warren Manufacturing Co., Inc. of Littleton, Mass.

Mr. Mahoney joined the staff at Warren as a telephone field engineer in 1958. He began his telephone service with the New England Telephone & Telegraph Co. Later he was employed as a power engineer for Kellogg Switchboard & Supply Co. of Chicago.

In his new capacity, his duties will involve marketing of the present Warren electronic power equipment plus new product research and market analysis.

Western Electric To Build Equipment Plant in Mo.

The Western Electric Co. was to start work on the initial unit of a new permanent plant on Route 50 between Kansas City and Lee's Summit, Mo., it was announced on Aug. 14, by Paul R. Brousse, vice president, manufacturing.

The first stage of construction, to be completed in the first half of 1962, will consist of a 12 million dollar plant, and 600,000 square feet of space for manufacturing electronic equipment for the Bell Telephone System. When completed, the plant will afford an employment potential of more than 2,500 men and women.

As the need for more manufacturing facilities develops, it is expected that the initial building will be nearly doubled in size, thus bringing to com-

After ringing a K-500 telephone which was packed in ice to acclimatize it for service in Alaska, O. C. Bailey (left), Kellogg Switchboard & Supply Co. vice president and director of sales, presents the instrument to Gilbert Sumner, the 500th student graduated from Kellogg's COE maintenance training school. Gilbert hails from Anchorage, Alaska, and is employed by the City of Anchorage Telephone Co. Dick Reynolds, senior instructor in the school, and Bart Arseneau (right), an equipment engineer who spent several years with the Anchorage company before his employment by Kellogg, apparently enjoy the obvious insinuation of hot Chicago summers and cold Alaskan winters. Kellogg is the communications division of International Telephone & Telegraph Corp.

pletion plans originally announced in 1957.

No date has been established for the second phase of construction, since this depends on how rapidly the needs for more space develop.

Meanwhile, operations will be expanded in the company's leased quarters at 1227 E. 119th St., Grandview, where 500 Kansas Cityans are now employed. The number of employes there is expected to grow to 1,000 by early 1960.

Started largely as a training activity, this plant is developing into an important supplier of various electronic components required in the telephone system.

As space becomes available in the building on Route 50, employes and facilities will be transferred from Grandview to the permanent plant.

The new work force of 2,500 will swell Western Electric's local payroll for manufacturing purposes to about 12 million dollars annually when the first building on Route 50 is fully staffed, an increase of nearly 10 million dollars over the present total for the Grandview quarters.

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LC 26, complete	60
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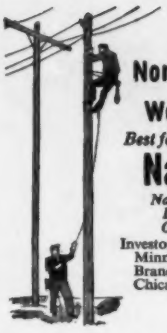

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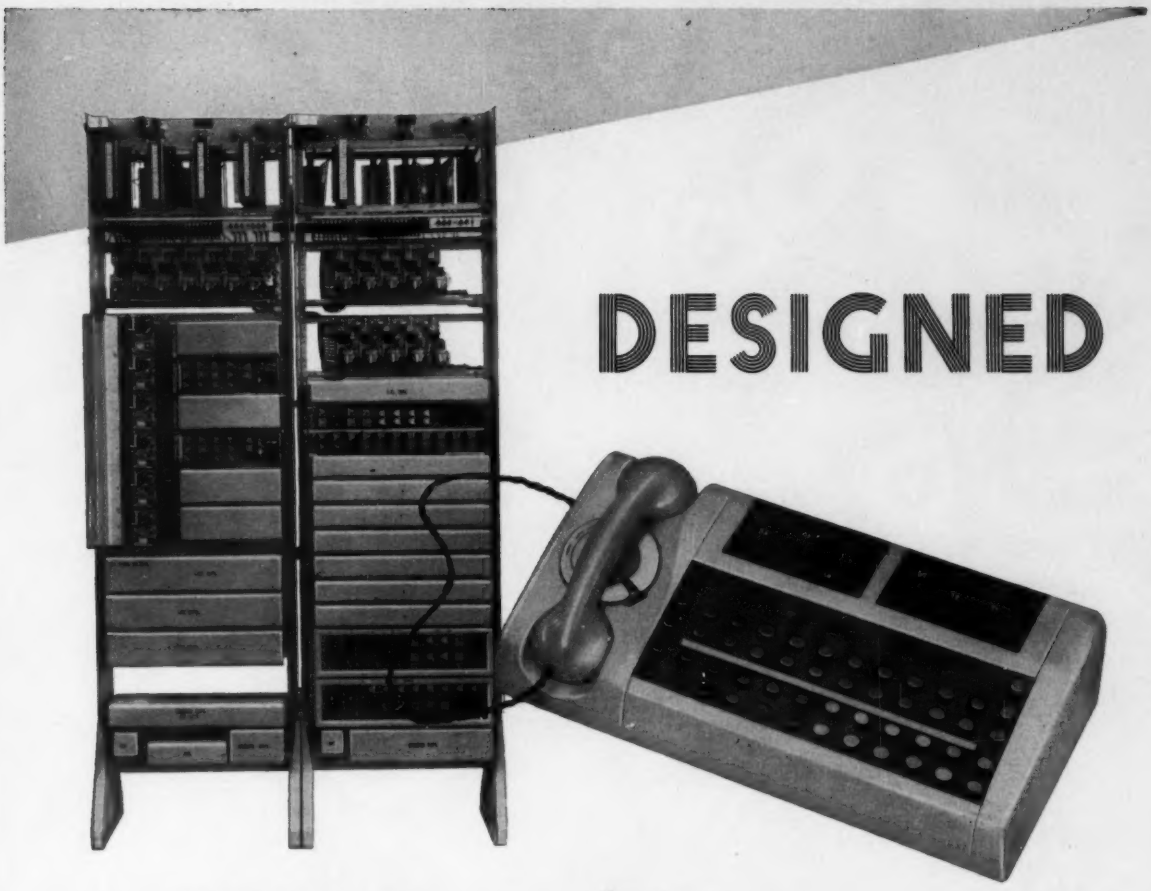

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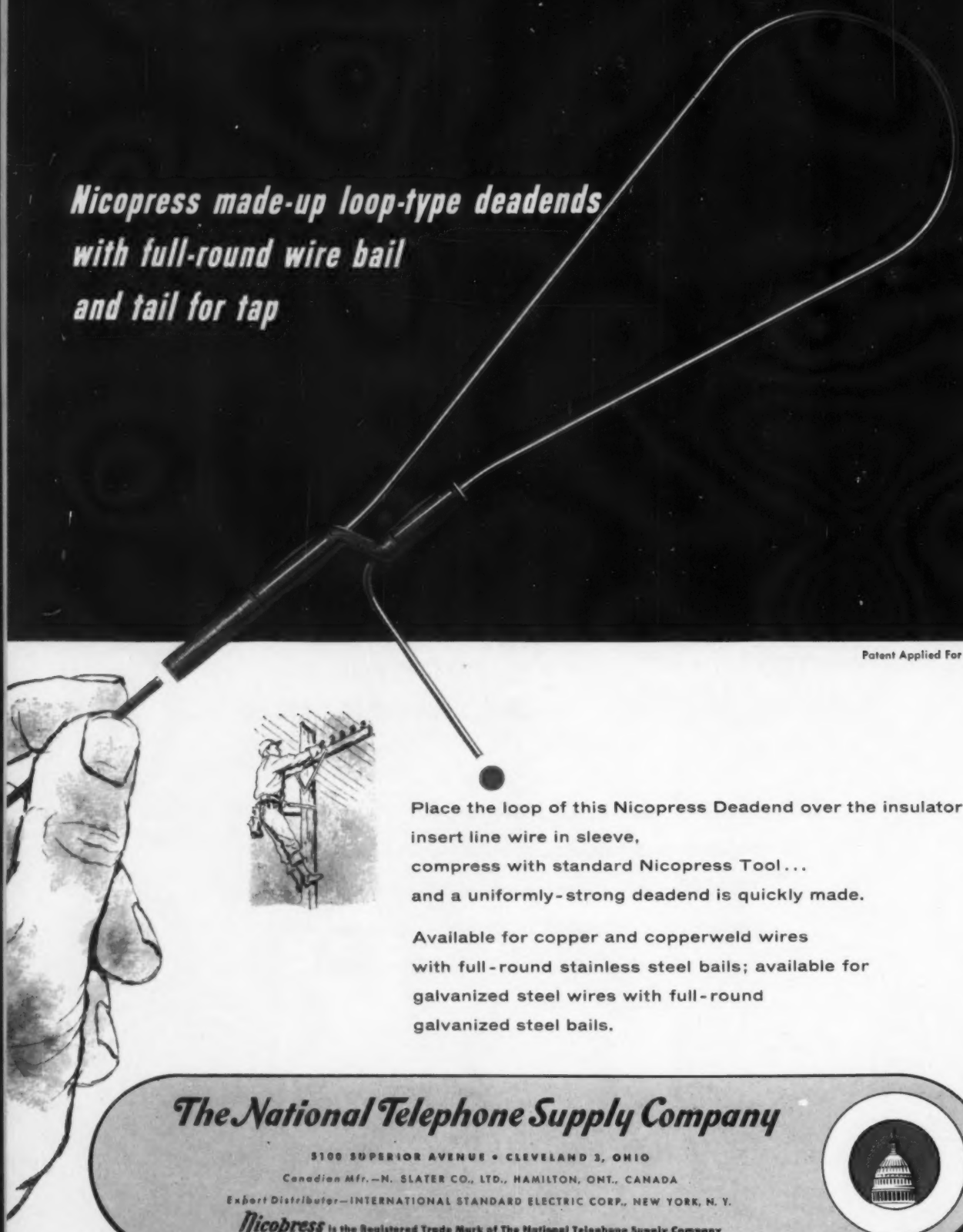

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